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ARTICLES

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Full Length Research Paper

Evaluation of innovation ability of high-tech enterprises based on catastrophe progression method

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Previous researches have utilized analytic hierarchy process, factor analysis and other methods in investigating innovation ability; however, these have been found to have a common problem that is either too subjective or involves a complex calculation procedure. Application of catastrophe progression method in this paper on innovation ability evaluation of high-tech enterprises helps to avoid these problems. The research results show that the innovation ability of Chinese high-tech enterprises keeps enhancing from the Interior West to the Eastern coastal region, with creativity and innovation efficiency closely related.

Key words: Catastrophe progression method, innovation ability, high-tech enterprise.

INTRODUCTION

Since the concept of innovation was first introduced by the famous economist Schumpeter in 1912, many scholars have done a lot of researches about innovation. Wei and Xu (1995) argue that innovation is both a systematic capacity and a combination of product and process innovations that is deeply influenced by the enterprise's innovation strategy. Liu (2006) argues that the essence of enterprise innovation system is the unity of enterprise system innovation and technological innovation that includes not only its own system of technological innovation, but also other relevant systems to promote technology innovation. It is a system network that centers on technological innovation axis. In addition, Weiqiang (1995), Gao (1998) and Bai (2002) also studied the innovation from different perspectives. Presently, the domestic and foreign scholars mainly use factor analysis

method, data envelopment analysis (DEA) method, principal component analysis (PCA), analytic hierarchy process (AHC), and neural network method. By analyzing the factors influencing the effect of high-tech enterprise's technological innovation capability, Cheng and Chen (2015) established the evaluation index system of technological innovation capability for high-tech enterprises and evaluated a chemical fiber enterprise technology innovation ability using the analytic hierarchy process and the evaluation index system, as well as analyzed the results. Hou et al. (2009) used the principal component analysis to evaluate and analyze the innovation ability of 31 provinces and cities across China in 2008. Also, Liu (2006) used the DEA method to evaluate the innovation performance of private science and technology enterprises in Anhui Province on the

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basis of building a private technology enterprise innovation performance evaluation index system. Su and Zhang (2002) partly expanded the enterprise technological innovation capability evaluation method based on the construction of index system of enterprise technological innovation capability by using artificial neural network method on the evaluation of enterprise technological innovation capability.

On the basis of establishing the factor analysis model of measuring and evaluating the technological innovation capability of enterprises, Bai et al. (2008) uses factor analysis to evaluate the technological innovation capability of 15 enterprises in Zhejiang Province. Qian Xuesen (1982) thinks that the above methods are subjective or complex in calculation, while catastrophe progression method is a comprehensive one which first decomposes the main bodies assessed through many levels, generates mutation fuzzy membership function by the catastrophe theory and fuzzy mathematics and then obtain a parameter through integrated quantitative operation of normalized formula to get the total membership function. Its biggest feature is that it only needs to determine the relative importance of each evaluation index (Qian, 1982), and no longer needs to design the weights of the indexes, which greatly reduces the subjectivity and research process without losing its scientific nature and rationality, eventually making the operation simple and accurate. This is the greatest feature compared to other methods. The catastrophe progression method has not been applied before to the evaluation of innovation capability of high-tech enterprises.

BASIC THEORY AND EVALUATION STEPS OF CATASTROPHE PROGRESSION METHOD

Basic theory of catastrophe progression method

Dou (1994) points out that catastrophe theory is the theoretical basis of catastrophe progression method and a new branch of mathematics, which is founded by France mathematician Rene Thom and focuses on the mutation (change) which includes not only the mechanics of topology, the basis of calculus, but even including the Singularity Theory and mathematical theories such as structural stability. It is called "calculus mathematics after another revolution." Catastrophe progression method is a comprehensive method which first decomposes the main bodies assessed through many levels, generates mutation fuzzy membership function by the catastrophe theory and fuzzy mathematics and then obtains a parameter through integrated quantitative operation of normalized formula to get the total membership function. Its biggest feature is that it only needs to determine the relative importance of each evaluation index (Dou, 1994), and no longer need to design the weights of the indexes,

which greatly reduces the subjectivity and research process without losing its scientific nature and rationality as well as making the operation simple and accurate. Through different conditions of catastrophe model analysis and comparative study, Rene Thom summed up that when the state variable is less than 2 and the control variable less than 4, various mutations can be summed up as 7 standard mathematical models.

Evaluation steps of catastrophe progression method

Establishing evaluation index system

Dou (1994) also points out, according to the evaluation objectives, that the evaluation index is decomposed through multiple levels from top to bottom, and then arranged in inverted goal tree hierarchy. Based on the principle of catastrophe progression method, only the bottom indicator data is needed to calculate the index value step by step until the target value is calculated at its highest level. Normally, mutation of some state variables of the system control number cannot be more than 4, compared to common cusp, swallowtail catastrophe and butterfly mutation system control variables which are 2, 3 and 4, respectively. Therefore, the number of sub indexes for each single index decomposition cannot be greater than 4 (Dou, 1994).

As required by the principle of catastrophe progression method, all parameters need to be first classified according to the logic of contradictions within the system, distinguish between major and minor contradictions, and then break down major and minor contradictions to finally get the quantitative index. According to this principle, the indexes in the evaluation model are decomposed in turn. To reduce its subjectivity, this paper used the entropy method to calculate the weights of the indexes at different levels, and the importance of the indexes at different levels is determined according to the size of the weights, so as to construct an evaluation index system. After the evaluation index is determined, the evaluation index data is treated with dimensionless method in order to avoid the inequality of the indexes due to the difference between the dimension and the dimension unit.

Determining type of indicators at all levels of the system model

In this paper, as the importance of each index on the same system differs, we need to first determine the major and minor aspects and mutations of the index system subsystem model type. The program is a prerequisite for establishing evaluation system of catastrophe progression method. In order to judge the mutation membership function according to the corresponding mutation series normalization formula, the catastrophe

Table 1. The model of mutation series formula and illustration.

Parameter	The cusp catastrophe system	The swallowtail catastrophe system	The butterfly mutation system
Model	$F(x)=x4+ax2+bx$	$F(x)=x^5+ax^3+bx^2+cx$	$F(x)=x6+ax4+bx3+cx2+dx$
Normalized formula	$x_a = a^{1/2}, x_b = a^{1/3}$	$x_a = a^{1/2}, x_b = a^{1/3}, x_c = c^{1/4}$	$x_a = a^{1/2}, x_b = a^{1/3}, x_c = c^{1/4}, x_d = d^{1/5}$
Diagram	$\boxed{X}$ a b	$\boxed{X}$ a b c	$\boxed{X}$ a b c

model subordinate to the index at different levels is determined. Methods to determine the mutation model is decomposed into two superior index system corresponding to the cusp catastrophe model; the index system is divided into three indexes and the corresponding swallowtail superior index is decomposed into four indexes system corresponding to the butterfly catastrophe model. Table 1 shows the catastrophe progression, system model, formula and diagram. Here the entropy method is used to calculate the weight of each index, the importance of the sort by weight index (the principal aspect of a contradiction) corresponding to the main control variables, and the secondary indicators (conflict on the secondary side control variables corresponding to secondary) model.

Conducting of comprehensive evaluation using normalization method

In the case of multiple targets, Fuzzy theory think if A_1, A_2,......,A_n are fuzzy sets, the strategies to meet the above targets are: $C=A_1 \cap A_2 \cap \cdots \cap A_n$. The membership function is: $U_{C(X)}$, $UA_{n(X)}$ is the membership function of evaluation index of Ai, and $U_{C(X)}$ is the minimum of membership function of Ai (Evaluation index) (Lu Fang, 2008).

Assuming that A_1 and A_2 are different alternatives, if the membership function exists, it means that A_1 is better than A_2. Thus, the X value on the basis of the "same object of the control variables corresponds to the "minimax" principle, and if there are complementarities among the indexes, we usually use its average as substitution. In the final comparison of each scheme, according to the principle of "minimax", that is, according to the total evaluation index score, each evaluation object will be sorted.

"Complementary" and "Non-Complementary" principles are two crucial criteria for target evaluation when using catastrophe progression method. If there is no obvious interrelationship between the control variables (such as a, b, c, etc.) of a system, the minimum value of the mutation series corresponding to each control variable should be selected when calculating the system state variable x,

that is, "Non-Complementary "minimax" principle. If there is a clear interrelationship between the control variables of a system, the "averaging" principle in the "complementary" principle should be followed. Theoretical studies have shown that only when the above principles are followed, the requirements of the divergent equations in the catastrophe theory can be met. According to this, we first calculate the number of mutations of the control variables on the evaluation index by the normal formula, and use the obtained mutation series as the control variable of the index; thereafter, the number of evaluations of the evaluated units was obtained by taking the number of stages. This score is the evaluation of the innovation capability of high-tech enterprises.

INNOVATION ABILITY EVALUATION OF HIGH-TECH ENTERPRISES

Construction of index system

Based on the "China Enterprise Innovation Capability Analysis Report" and the shortcomings of application from Shen and Lei (2006), Lu Fang (2008), Wu Feng et al. (2010), and Chen and Chen (2006), this paper constructs the evaluation index system of innovation ability, which includes two aspects: innovation output and innovation input ability, as shown in Figure 1. According to the evaluation procedure of the mutation series method, the four secondary indicators like the innovation output, the innovation resource and the innovation activity and innovation environment of the enterprise are decomposed one by one, and the third-level indexes which can be further decomposed can be quantified to stop decomposition. The innovation ability evaluation system is constructed into an inverted tree-like multi-level target evaluation structure, and is being ranked by the importance of the index. In order to sort the importance of indicators, this paper uses the entropy weight method to calculate the weights of each index from bottom to top, and then sort the indexes according to the weight to reduce the subjectivity of the links. The main indicators are the former ones and secondary indicators the latter
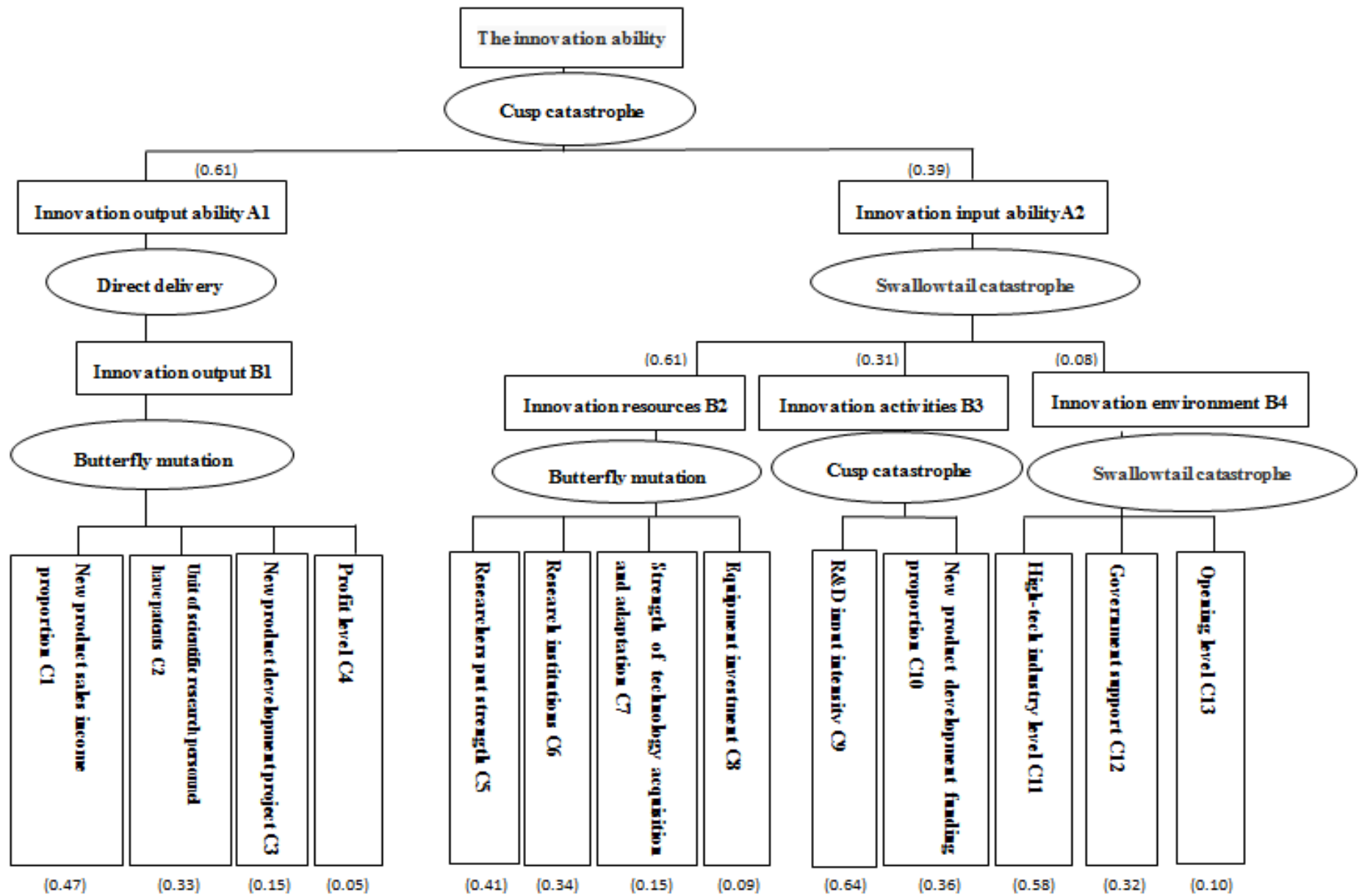
Figure 1. The high-tech enterprises ' innovation capability evaluation index system.

ones. Ultimately, we will build a complete evaluation index system for the high-tech enterprise innovation ability.

Determination of the mutation system type

According to the mutation sequence method, to evaluate the steps, we will determine the level of evaluation parameters of the mutation system type from top to bottom:

First-level index system: The innovation capability of high-tech enterprises includes two first-level indicators of innovation output and input. According to the principle of mutation series method, it corresponds to the cusp mutation system, and there are obvious interrelations and effects between indicators. The control variables are denoted as A1 and A2, respectively.

Secondary indicators system: First-level indicators of innovation output only decompose one secondary indicator, so it can be directly delivered. Innovation investment can be divided into three secondary indicators. According to the principle of mutation series method, it corresponds to the swallowtail mutation system, and there are obvious interrelations and effects between the indicators, which is the complementary type, with the control variables denoted as B2, B3, and B4.

Third-level index system: Secondary index will be decomposed into four third-level indexes, which correspond to the butterfly mutation system. There is no obvious interrelationship among the indexes, and the control variables are labeled C1, C2, C3 and C4.

Innovation resource will be decomposed into four third-level indexes, which correspond to the butterfly mutation system. Here, there is no obvious interrelationship among the indexes, and the control variables are labeled C5, C6, C7 and C8.

Innovation resource will be decomposed into two third-level indexes, corresponding to the butterfly mutation system. Here, there is no obvious interaction between the indexes, and the control variables are marked as C9, C10.

Innovation resources will be decomposed into three third-level indexes, corresponding to the swallowtail mutation system. There is a clear correlation between the indicators, which falls under the complementary type, and control variables are marked as C11, C12 and C13.

Data processing

The research data of this paper are derived from the "China High-Tech Statistical Yearbook (2011 - 2015)" and

"China Science and Technology Statistical Yearbook (2011 - 2015)" and the relevant data of 29 provinces (autonomous regions and municipalities) were collected. Since some of the data are from Qinghai Province and Tibet Autonomous Region, the study does not include these two provinces. According to the evaluation principle and requirements of the mutant series method, the control variable is restricted to between 0 and 1, in view of the different indicators in the evaluation system with different dimensions and dimension units. In order to eliminate the non-generability of the resulting indicators, this paper uses the range transformation method to carry on the dimensionless processing to all the evaluation indexes [83]. The dimensionless processing procedure is as follows:

Positive indicators:

$$y_{ij} = \frac{X_{ij} - \min_{1 \le j \le n} X_{ij}}{\max_{1 \le j \le n} X_{ij} - \min_{1 \le j \le n} X_{ij}}$$

(1)

i = 1, 2,……,m (m is the index number), j = 1, 2, ……, n (n is the number of objects).

Innovation ability evaluation

Using the normal formula of the mutation series method to calculate and evaluate the innovation ability of high and new technology enterprises, this paper takes the data of Guizhou High-tech Enterprises as an example to illustrate the calculation process.

Third-level index system

The third-level indicators of innovation output B1 will be decomposed into new product sales revenue ratio (C1), unit of scientific research personnel owned by all the invention patents (C2), new product development projects (C3) and profit levels (C4); all of which are the butterfly mutation model, given as

$$X_{c_1} = \sqrt{c_1} = \sqrt{0.335} = 0.579, \qquad X_{c_2} = \sqrt[3]{c_2} = \sqrt[3]{0.112} = 0.48,$$

$$X_{c_3} = \sqrt[4]{c_3} = \sqrt[4]{0.041} = 0.449, X_{c_4} = \sqrt[5]{c_4} = \sqrt[5]{0.541} = 0.88,$$

This is a non-complementary system. So, according to the principles of "non-complementary, minimax", the index value of innovation output (B1) is equal to $\min(X_{c1}, X_{c2}, X_{c3}, X_{c4},) = \min(0.579, 0.48, 0.449, 0.88) = 0.449$.

The third-level indicators of innovation resources (B2) will be decomposed into the strength of researchers (C5),

the number of scientific research institutions (C6), the strength of technology acquisition and transformation (C7) and the strength of equipment investment (C8); all of which are also the butterfly mutation model, given as

$$X_{c_5} = \sqrt{c_5} = \sqrt{0.864} = 0.930, X_{c_6} = \sqrt[3]{c_6} = \sqrt[3]{0.014} = 0.239,$$

$$X_{c_7} = \sqrt[4]{c_7} = \sqrt[4]{0.172} = 0.644, X_{c_8} = \sqrt[5]{c_8} = \sqrt[5]{0.264} = 0.766,$$

This is a non-complementary system. So, according to the principles of "non-complementary, minimax", the index value of innovation resource (B2) is equal to

$$\min(x_{c5}, x_{c6}, x_{c7}, x_{c8},) = \min(0.580, 0.239, 0.644, 0.766) = 0.$$

The third-level indicators of the innovation activities (B3) will be decomposed into the intensity of R&D input (C9), the proportion of new product development costs (C10), all of which are the cusp catastrophe model, given as

$$X_{c_9} = \sqrt{c_9} = \sqrt{0.683} = 0.827, X_{c_{10}} = \sqrt[3]{c_{10}} = \sqrt[3]{0.265} = 0.643,$$

This is a complementary system. So, in accordance with the principle of "complementary mean", the index value of innovation resources (B3) is equal to

$$x_{B_3} = (x_{c_9} + x_{c_{10}})/2 = (0.827 + 0.643)/2 = 0.735,$$

The third-level indicators of innovation activities (B4) will be decomposed into the high-tech industry development level (C11), the government support (C12) and the level of opening (C13); all of which are the swallowtail mutation model, given as

$$X_{c_{11}} = \sqrt{c_{11}} = \sqrt{0.131} = 0.362, X_{c_{12}} = \sqrt[3]{c_{12}} = \sqrt[3]{0.368} = 0.7$$

$$X_{c_{13}} = \sqrt[4]{c_{13}} = \sqrt[4]{0.003} = 0.233,$$

This is a complementary system. So, in accordance with the principle of "complementary mean", the index value of the innovation resources (B4) is equal to

$$X_{B_4} = (X_{c_{11}} + X_{c_{12}} + X_{c_{13}})/3 = (0.362 + 0.717 + 0.233)/3 = 0.$$

Secondary index system

The first-level indicators of index system is innovation output ability (A1), which only decomposes one secondary indicator, that is the innovation output (B1), making the link to be directly transferred as

$$x_{A_1} = x_{B_1} = 0.449$$
.

The first-level indicators of index system is innovation input ability (A2), which is the dovetail mutation system that consist of the second level of indicators, including the innovation activities (B2), the innovation resources (B3) and the innovation environment (B4), given as:

$$X_{B_b} = \sqrt{X_{B_2}} = \sqrt{0.645} = 0.803, X_{B_c} = \sqrt[3]{X_{B_3}} = \sqrt[3]{0.735} = 0.902,$$

$$X_{B_d} = \sqrt[4]{X_{B_4}} = \sqrt[4]{0.437} = 0.813,$$

This is a complementary system. So, in accordance with the principle of "complementary mean", the index value of the innovation input (A2) is equal to

$$x_{A_2} = (x_{B_b} + x_{B_c} + x_{B_d})/3 = (0.803 + 0.902 + 0.813)/3 = 0.839.$$

First-level index system

The innovation capability of high-tech enterprises is decomposed into two primary indexes: innovation output (A1) and innovation input (A2), according to the requirements of mutation series method. Because there is a cusp mutation model, then

$$x_{A_a} = \sqrt{x_{A_1}} = \sqrt{0.449} = 0.670, x_{A_b} = \sqrt[3]{x_{A_2}} = \sqrt[3]{0.839} = 0.9943,$$

In the same manner as described above, we will calculate respectively the other provinces and autonomous regions of the two indicators of innovation and output (B1), innovation resources (B2), innovation activities (B3) and innovation environment (B4) and first-level indicators of innovation and production (A1) and innovation into the results of A2. Results of the final evaluation of the innovation capability system of the high-tech enterprises in the 29 provinces and municipalities are directly under the central government and autonomous regions and are shown in Table 2.

Evaluation and analysis of enterprise innovation capability

It can be seen from Table 2 that the innovation ability of the high-tech enterprises in the eastern provinces is better than that in the central and western regions. In addition to Sichuan Province, the top ten are the eastern provinces and cities while the last five are from the western region. But the western region also has a strong ability to innovate, such as Sichuan Province which ranked sixth in the country. Ranking 18, Guizhou's high-tech enterprises in the western region is weak in innovation capacity and is at a lower level. The national high-tech enterprise innovation ability as a whole keeps increasing from the western inland to the eastern coastal areas.

As shown in Figure 2, the innovation capacity of high-tech enterprises in 29 provinces (autonomous regions and municipalities directly under the central government) is mainly concentrated in the three regions: the regional areas in the eastern coastal region (I), the central and southwestern parts of the region (II) and the northwest inland, the southwest and northeast region (III). The

Table 2. Results of 29 provinces nationwide city innovation ability evaluation of high-tech enterprises.

Area	Innovation output	Ranking	Innovation input	Ranking	Innovation ability	Ranking
Guangdong	0.865312	1	0.863551	2	0.941248	1
Beijing	0.844628	2	0.841137	5	0.931500	2
Zhejiang	0.834124	3	0.845605	3	0.929468	3
Jiangsu	0.792298	4	0.840955	6	0.917004	4
Tianjin	0.789376	5	0.722750	26	0.892945	5
Sichuan	0.719047	6	0.816499	15	0.891311	6
Anhui	0.713864	7	0.821620	13	0.890755	7
Shanghai	0.682641	10	0.843145	4	0.885468	8
Fujian	0.702301	9	0.802531	18	0.883665	9
Shandong	0.679318	11	0.810132	17	0.878214	10
Hunan	0.667964	12	0.822208	12	0.877060	11
Chongqing	0.702635	8	0.749669	23	0.873330	12
Shaanxi	0.605602	18	0.903247	1	0.872427	13
Hubei	0.641365	17	0.839917	7	0.872180	14
Hainan	0.650369	14	0.817121	14	0.870674	15
Liaoning	0.646445	16	0.811103	16	0.868305	16
Yunnan	0.654004	13	0.790111	20	0.866591	17
Guizhou	0.598527	19	0.839454	8	0.858490	18
Henan	0.649315	15	0.726891	25	0.852466	19
Hebei	0.587847	20	0.801571	19	0.847818	20
Jiangxi	0.545724	22	0.786339	21	0.830867	21
Heilongjiang	0.498141	25	0.834681	10	0.823667	22
Shanxi	0.585413	21	0.674114	28	0.820972	23
Jilin	0.525425	23	0.746825	24	0.816069	24
Ningxia	0.472158	28	0.839052	9	0.815160	25
Gansu	0.474538	27	0.823034	11	0.813005	26
Xinjiang	0.493290	26	0.769437	22	0.809344	27
Guangxi	0.501352	24	0.700941	27	0.798182	28
Inner Mongolia	0.341278	29	0.589241	29	0.711276	29
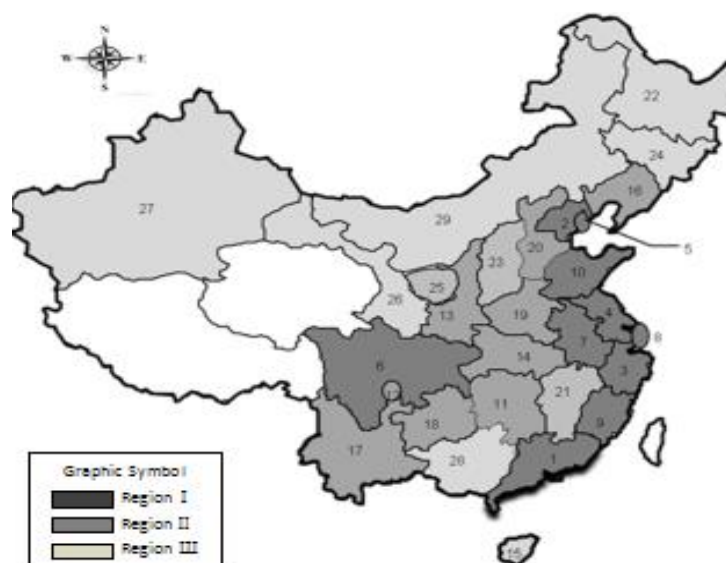
Figure 2. 29 provinces (municipalities and autonomous regions) distribution area of high-tech enterprises' innovation capability.

provinces of the region I are mainly provinces and cities in the eastern coastal region, the most of which rank top ten in terms of innovation capacity. They are Shandong (10), Fujian (9), Shanghai (8), Anhui (7), Tianjin (5), Jiangsu (4), Zhejiang (3), Beijing (2) and Guangdong (1). However, there are inland provinces such as Sichuan (6) squeezed into the top ten.

Most cities in Region III are in inland, with enterprise innovation capacity ranking in the last ten, such as Xinjiang (27), Ningxia (25), Inner Mongolia (29), Gansu Province (26), Shanxi (23), Guizhou (20) and Jiangxi (21) in the Yangtze River Basin, Guangxi (28) and Heilongjiang (22). The 10 provinces, autonomous regions and high-tech enterprises are at a lower state in the country's ability, and their innovation capacities are poor. The provinces of Region II are mainly located in the central and southwestern parts of the country, with enterprise innovation capacity ranking mainly concentrated in 11 to 19, such as Shaanxi (13), Henan (19), Guizhou (18), Yunnan (17), Liaoning (16), Hainan (15), Hubei (14), Chongqing (12). The nine provinces, the city's high-tech enterprise innovation capability in the country is located in the middle and the level of innovation is better.

In order to quantify the innovation efficiency of each region, the innovation efficiency (innovation efficiency = innovation output / innovation input) of high-tech industry in each region is calculated according to the data in Table 2, as shown in Table 3.

As can be seen from Table 3, the area of the bold font is located in Area I in Figure 3, with the first echelon of innovation capacity, the top ten in innovation capacity, and most of its innovation efficiency also high. Only the innovation efficiency of Shandong and Shanghai fell out of the top ten. Similarly, the area represented by the black normal font is located in Area III in Figure 3, where the innovation capacity is weak and its innovation efficiency is also ranked after twenty. The area represented by the oblique font is located in Area II in Figure 3. The innovation capacity is located in the middle of the country, and the innovation efficiency in most areas is similar to that of its innovation capacity. Only the innovation efficiency of Shaanxi and Guizhou is relatively low.

From the chart it can be seen that innovation and innovation efficiency are closely related to the specific trend shown in Figure 3. Innovation efficiency and innovation capacity of the relationship between the level of innovation and efficiency directly affect the number of innovation and output, as well as the size of innovation

SUGGESTIONS AND COUNTER MEASURES

As shown in Figure 2 and Table 3, the innovation capability of high-tech enterprises in China can be divided into three regions, with differences in innovation output, innovation investment and innovation efficiency.

Therefore, considering the three aspects above, the present study makes some targeted suggestions to enhance the innovation ability of high-tech enterprises in the three regions.

Proposal and countermeasures of Region I

The innovation efficiency and innovation output of high-tech enterprises in this area are high; as a result, the high-tech enterprises in this area should set up enterprise innovation resource base, increase innovation investment, and also keep up the potential development that is innovation-driven. To be specific, improvements can be made in the following aspects:

1) Formulating the evaluation mechanism of innovation talents within enterprises: The enterprises should regularly evaluate the innovation level of employees, judging by the dimensions such as the engagement and the achievement in innovation activities. Evaluation results should be matched with the salary and welfare, according to which the innovation talents at different levels are better distinguished, and the higher the rating scale they have, the better benefits they enjoy.

2) Setting up enterprise innovation fund base which includes special funds for innovation talents and scientific research: Special fund for talents is specially used for the training and introduction of high-level creative talents. Regular innovative training to employees should be regularly conducted within the enterprise, and quantified evaluation should be applied in training performance and results which are included in the performance of employees' participation in innovation activities. The enterprises would evaluate the early innovation achievements of the high level innovative talents being introduced into the enterprises according to the evaluation system. On the basis of the evaluation results, besides some preferential treatment prescribed by the company, the talents also enjoy a one-time high subsidy in terms of housing, traffic etc. Setting up special funds for scientific research is to ensure the flow of funds for R&D activities of enterprises. The enterprises themselves should continue to invest in scientific research, and the support of policy-based financial institutions is also essential. As shown in the previous research results, little support for innovation from financial institutions is achieved. Therefore, banks and other financial institutions should optimize the loan risk compensation mechanism for enterprises' developing innovative project, and provide more financial support for enterprise innovation activities under the premise of safeguarding the bank's own interests.

3) Setting up enterprise R & D Department: According to the evaluation results of the innovative talents, the high-level innovative talents should establish the enterprise scientific research department which is responsible for

Table 3. The country's 29 provincial high-tech enterprise innovation efficiency evaluation results.

| Area	Innovation input	Innovation output	Innovation efficiency	Innovation efficiency ranking	Innovation capability ranking
Tianjin	0.72275	0.789376	1.092184	1	5
Beijing	0.841137	0.844628	1.00415	2	2
Guangdong	0.863551	0.865312	1.002039	3	1
Zhejiang	0.845605	0.834124	0.986423	4	3
Jiangsu	0.840955	0.792298	0.942141	5	4
Chongqing	0.749669	0.702635	0.93726	6	12
Henan	0.726891	0.649315	0.893277	7	19
Sichuan	0.816499	0.719047	0.880647	8	6
Fujian	0.802531	0.702301	0.875108	9	9
Anhui	0.82162	0.713864	0.868849	10	7
Shanxi	0.674114	0.585413	0.868418	11	23
Shandong	0.810132	0.679318	0.838528	12	10
Yunnan	0.790111	0.654004	0.827737	13	17
Hunan	0.822208	0.667964	0.812403	14	11
Shanghai	0.843145	0.682641	0.809637	15	8
Liaoning	0.811103	0.646445	0.796995	16	16
Hainan	0.817121	0.650369	0.795927	17	15
Hubei	0.839917	0.641365	0.763605	18	14
Hebei	0.801571	0.587847	0.733369	19	20
Guangxi	0.700941	0.501352	0.715256	20	28
Guizhou	0.839454	0.598527	0.712996	21	18
Jilin	0.746825	0.525425	0.703545	22	24
Jiangxi	0.786339	0.545724	0.694006	23	21
Shanxi	0.903247	0.605602	0.670472	24	13
Xinjiang	0.769437	0.49329	0.641105	25	27
Heilongjiang	0.834681	0.498141	0.596804	26	22
Inner Mongolia	0.589241	0.341278	0.579182	27	29
Gansu	0.823034	0.474538	0.576572	28	26
Ningxia	0.839052	0.472158	0.562728	29	25
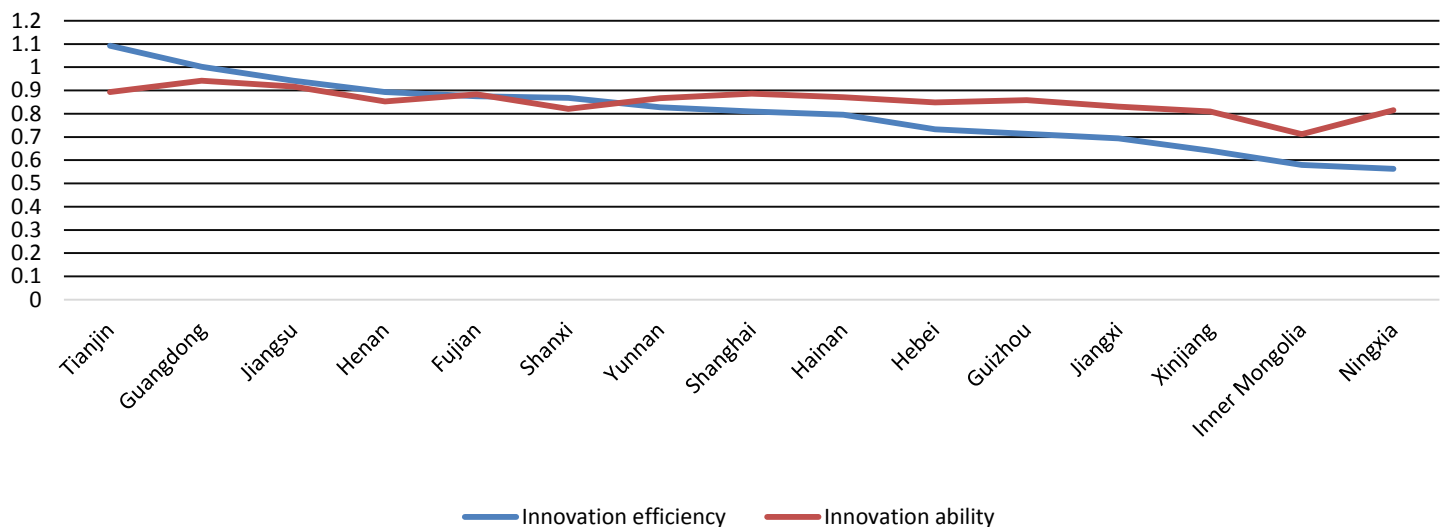
Figure 3. The relationship between innovation efficiency and innovation ability.

enterprise leaders directly. The innovation fund base and the innovative talents evaluation system should ensure the capital and talent, specializing in tackling technology problems on products and services and continuously improving the technological content of products with the service, as well as market competitiveness.

Proposal and countermeasures of Region II

The innovation efficiency and innovation output of the enterprises in the region are generally in the middle level, with investment in innovation relatively small. In particular, the innovation environment is relatively poor. Thus, the region should focus on improving the innovation environment and promoting the industrial development. Specific recommendations are as follows:

i) Strengthening the government's support for high-tech enterprises and establishing a relatively "relaxed" business survival environment: Establishing and constantly improving a motivating and guiding mechanism of the financial funds, such as state-owned investment company investment and other forms of indirect financial expenditure, as well as guiding private capital and other social capital to enter, and constantly enrich and improve the innovation investment system. Establish a set of diversified capital to support the process and innovation of enterprise innovation. To promote or guide the risk of funds and venture capital companies on the role of innovation. On the one hand, it will be good for the enterprise to provide adequate funding for innovation activities; on the other hand, it will establish and improve the risk protection mechanism to minimize the enterprises innovation team, especially to reduce the risk and loss of innovation and their early development.

ii) Adjust the enterprise innovation tax incentives, focus on supporting major technical research, major market development and other key projects and important links so that investment and reinvestment of enterprises engaged in research will enjoy investment credit policy: Due to high cost, financing difficulties, insufficient support efforts and other reasons, many companies lack the funds to carry out systematic R & D activities. A considerable number of high-tech enterprises can only support low-level of technology research and development, which seriously hinders the Guizhou high-tech enterprises from attaining the pace of high-end innovation breakthrough.

iii) Led by the government, enterprises serve as the main body to hold technical seminars and the achievements exhibition exchange meeting on a regular basis. We should strengthen technical and economic exchanges with other regions both at home and abroad to raise the level of exposure to the outside world. From the results of the study, the high degree of openness of Guizhou's high-

tech enterprises in the western eight provinces ranked low in the country, ranking 29 among other provinces (autonomous regions and municipalities). It will not only affect the overall high-tech enterprises in Guizhou in expanding the scale of the market, but also affect the process of enterprise technology and the ability to accelerate the improvement of innovation. Therefore, it is necessary to formulate a relatively preferential trade policy, encourage foreign trade and exchange of high-tech enterprises, and hold regularly Chinese and foreign innovation products exhibitions to strengthen the exchanges and cooperation between Guizhou high-tech enterprises and other high-tech enterprises in other regions raising its degree of exposure to the outside world.

Proposal and countermeasures of Region III

The innovation output and innovation efficiency of enterprises in this region are very low, while the innovation investment is relatively high. Therefore, enterprises in this region should improve their innovation efficiency and enhance their capacity for innovation output. To be specific, measures are as follows:

i) The technician should become the owner of the company through the joint-stock reform in enterprises, allow the technical elements to fully participate in the distribution of income, and enhance the determination and motivation of scientific research staff to carry out innovative activities. The enterprises should establish and optimize the supporting incentive mechanism for technician, and increase satisfaction of technicians in welfare and occupation career, which is the fundamental path to guarantee that the enterprises would get more resources of high-quality innovative talents.

ii) Integrate innovative resources to build an innovation platform with enterprise as the main bodies. For the current high-tech enterprises in Guizhou Province, the characteristics of innovative environment and different institutions include having the resources; hence, it is necessary to build an innovation cooperation platform joined by many parties. High-tech enterprises will provide the innovation platform with necessary machinery and equipment. Universities, Research institutes, as well as university science and technology parks will provide the platform for human resources; financial institutions and governments can provide financial support for the platform to ensure that there is sufficient funding for innovation activities. Guide the advantages of multi-resources into the scientific and technological innovation cooperation platform, which is similar to the stereoscopic structure. In this way, not only can they give full attention to their own characteristics and advantages, but will also enjoy high efficiency, low cost of implementation of innovative activities, which is more conducive to the

sharing of innovative achievements and utilization.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Marketing activities as critical success factors: The case of seed producer cooperatives in Ethiopia

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The purpose of this study is to identify the specific marketing activities that contribute most to the performance improvement of seed producer cooperatives (SPCs) in Ethiopia. Both quantitative and qualitative procedures were adopted to extract information from knowledgeable and experienced experts using structured questionnaires. Results indicate that clear differences exist between Ethiopian SPCs in their intensity and quality of execution of marketing activities, indicating that these activities are managed and controlled by SPCs themselves. However, the similarity in patterns of intensity and quality of execution of marketing activities shows that these effects cannot be disentangled in the Ethiopian SPCs context. Ethiopian SPCs performed well on marketing activities related to interfunctional coordination, but poorly on activities associated with competitor orientation. SPCs are likely to perform better when they use a variety of marketing activities including quality control of product (seed), product differentiation, managing customer and supplier relationships, responding to customers and competitors, customer and competitor assessment, leadership, integration of activities, and interconnections among committees and members. Hence, to provide value to customers SPCs need to have resources and the capabilities to coordinate these resources in order to execute marketing activities efficiently and effectively.

Key words: Intensity of implementation, marketing activities, quality of implementation, seed producer cooperatives

INTRODUCTION

The performance of any firm depends strongly on the specific activities that the firm implements (Forman and Hunt, 2005; Hansen and Wernerfelt, 1989; Tvorik and McGivern, 1997). Internal behaviours and the internal environment that influence the performance of firms are known as organizational business performance factors (Scott-Young and Samson, 2008; Wood, 2006). They can be altered and modified by the organization itself, such as adjustments to and adaptations in personnel capabilities, physical facilities, the organizational structure, and changes in budget allocations.

For firms it is important to identify the specific activities

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that affect their performance (Appiah-Adu et al., 2001; Scott-Young and Samson, 2008). This would help the firm to make appropriate decisions about investments and budget allocations. Marketing research has identified a wide variety of internal activities that influence firm performance (Mokhtar et al., 2009). There is, however, no comprehensive and unequivocal list of internal activities, as these may be contingent on the type of the business and the external environment (Appiah-Adu, 1998).

Marketing activities influence the success of the firm (Kumar et al., 2011). The purpose of marketing activities is to align organizational efforts with customer needs and thus to offer better products and services to customers. Empirical research reveals that there is a direct contribution of marketing activities to firm performance (Bansal et al., 2001). Thus, selecting appropriate marketing activities is crucial for increasing firm success. At the highest level of abstraction such marketing activities relate to the concept of market orientation and reflect customer orientation, competitor orientation, and interfunctional coordination (Kirca et al., 2005).

Dunn et al. (1986) have identified marketing activities related to product (planning, schedules, service), sales (control, forecasts, training, recruiting), control (inventory, quality), relations (customers, dealers, public), market research, pricing, advertising, warehousing, packaging, and credit extension. Firms need to identify the specific marketing activities that influence their performance, but this influence depends on the business strategy and the external context. As a result, different marketing activities have been identified in prior research as influential for firm performance. In the context of new product development success, for instance, Cooper and Kleinschmidt (1993) identified marketing activities such as market assessment (study), product and customer tests, and technical assessment. Marketing activities such as product promotion, product quality, employees' training, pricing mechanisms, targeting strategy, and satisfied with skills levels were used to explain small firm overall business performance in the UK (Wood, 2006).

Whether and how firms implement marketing activities depends on the firms' access to resources and their capabilities to coordinate those resources. Thus, both resources and firm capabilities influence firm performance (Nath et al., 2010; Yu et al., 2014). Firms use their own resources to implement marketing activities aimed at improving their competitive position in the market, which in turn enhances performance (Ketchen et al., 2007). Resources of a firm include both tangible (physical assets) and intangible (non-physical assets) resources. Firm capabilities refer to what the firm does at its core to effectively coordinate its resources. Firm capabilities enable the firm to coordinate, deploy and take advantage of its resources in the implementation of its strategies (Dutta et al., 2005). The firm's capabilities may include the technological competences, skills and commitment of

leadership, organizational capabilities, and strong cooperation and relationships with partners and stakeholders (Carmeli et al., 2010; Lin and Wu, 2012; Puni et al., 2014). Thus, identifying marketing activities that contribute to firm performance is the first important step for firms, but identifying resources and capabilities to implement those marketing activities effectively and efficiently is the second important step.

Prior research on identifying marketing activities and their effect on firm performance is scarce and has mostly focused on Investor-owned firms (IOFs) in developed economies (Morgan, 2012). Moreover, there has been little conceptual development and systematic examination of how researchers in marketing should measure the performance outcomes associated with marketing activities (Katsikeas et al., 2016). Based on the study examination of the literature, there has only been scant scholarly consideration regarding marketing activities in D&E economies in general and particularly for the small agricultural marketing cooperatives which are prevalent in such economies. With their dual objectives of serving customers as well as their members, cooperatives could benefit from insight into marketing activities that influence their performance, not only to gain more benefits from commercialisation, but also to support the well-being of their members (Grwambi et al., 2016).

To broaden our understanding of the influence of marketing activities on firm performance, this study focuses on the specific context of Ethiopian seed producer cooperatives (SPCs) and the marketing activities over which they have control. SPCs are business enterprises established by a group of farmers with the aim to produce and market quality seed to local markets and beyond, and to turn seed into a commercial product, so that it becomes a potential source of income and livelihood improvement for members (Subedi and Borman, 2013).

Previous studies in the context of SPCs in Ethiopia revealed that there is a positive and significant contribution of market orientation components to both the performance of the cooperative as well as to the livelihood improvement of its member farmers. SPCs that adopt a market orientation show better performance than SPCs that do not. Market orientation is a business philosophy which is operationalized through effective implementation of marketing activities reflected both by the intensity and quality of execution. Intensity of execution explicitly refers to the frequency with which SPCs practice marketing activities ('*do how often*'), and quality of execution refers to the way in which SPCs implement marketing activities ('*do how well*'). Therefore, this paper has two objectives: to understand which marketing activities improve most the performance of SPCs in Ethiopia; and to give practical and actionable advice for SPCs in terms of which capabilities are required to implement marketing activities that improve SPCs' performance most.

LITERATURE REVIEW

Organization business performance factors

Organizational business performance factors by definition influence firm performance (Hansen and Wernerfelt, 1989; Wood, 2006), and are thus crucial to sustain a business (Appiah-Adu et al., 2001; Forman and Hunt, 2005). Organizational business performance factors comprise of factors within the firms (Scott-Young and Samson, 2008), which they can control and manage through their capabilities and business decisions. A wide variety of organizational business performance factors can influence firm performance (Wood, 2006). These include effective management (Rahman, 2001; Yusof and Aspinwall, 2000), human resource management (Jameson, 2000), strategy and firm experience (Ahmet, 1993; Liargovas and Skandalis, 2010), and marketing strategy development (Morgan et al., 2003). These organizational business performance factors are strengths if the firm performs them better and weaknesses if the firm performs them worse than competitors. Thus, managing these factors is key to continued success of the firm.

Identifying organizational business performance factors

Not all organizational business performance factors contribute equally to firm success, depending on the nature and objectives of the firm and its context. Organizational business performance factors that are considered critical for firm performance are known as critical success factors (CSFs) (Dadashzadeh, 1989). The concept of CSFs first appeared in the literature in the 1980s when there was interest in why some organizations seemed to be more successful than others, and research investigated the success components (Ingram et al., 2000).

Critical success factors are defined in different ways in the literature (Amberg et al., 2005). There are two broad views on CSFs. The first is to consider CSFs as necessary conditions for the survival of the firm. CSFs are "those things that must be done if a company is to be successful" (Freund, 1988). Saraph et al. (1989) viewed CSFs as those critical areas of managerial planning and action that must be practised in order to achieve effectiveness. Brotherton (2004) considers CSFs to be combinations of activities and processes that must be designed to achieve outcomes specified in the company's objectives or goals.

Rockart (1979) explains CSFs as "the limited number of areas that, if they are satisfactory, ensure successful competitive performance for the organization." The second view is to consider CSFs as conditions that significantly improve the performance of the firm. Pinto and Slevin (1987) defined CSFs as "factors, which, if addressed, significantly improve performance." When those factors do not addressed properly, the performance of the organization will be less than defined. In both views, as the name implies, CSFs are a limited number of factors that significantly influence the performance of the firm (Selim, 2007). For the present study, from the perspective of SPCs in Ethiopia, CSFs are viewed as those activities and practices that improve the performance of the firm, which is in line with the second view. As identified in the literature CSFs are highly diverse, including among many: effective business strategies (Chen and Jermias, 2014), manpower and skills (Lin and Wu, 2012; Theodosiou et al., 2012), and leadership quality (Carmeli et al., 2010).

Business strategy can be described as a company's behaviour in the market, including policies, plans and procedures (Gemunden and Heydebreck, 1995; Porter, 1980). It is generally assumed that a well-planned strategy helps in leading a firm to success (Lynch et al., 2000). This holds also for marketing strategy which plays a central role in winning and retaining customers, ensuring business growth and renewal, developing sustainable competitive advantages, and driving financial performance (Srivastava et al., 1998).

Manpower and skills enable firms to make use of their resources in pursuing managerial objectives (Droge et al., 1994). Leadership quality is expected to inspire, guide and energize employees, to set standards and mobilize people to make extraordinary things happen in firms, to overcome uncertainty, turn visions into realities and move organizations forward (Kouzes and Posner, 2012). Leadership quality facilitates organizing and integrating activities for firm performance (Campbell et al., 2009; Kouzes and Posner, 2012; Martin, 2007; Puni et al., 2014).

Most CSFs remain fairly constant over time, though they may change as the firm's environment changes (Bullen and Rockart, 1981). CSFs may change over time depending on how the firm adapts to the external environment, including customers, competitors, suppliers, and regulators (Caralli, 2004). Thus, CSFs need to be reviewed periodically. For example, new legislation for the hotel industry on the privacy of customer information may result in a CSF like 'customer information management' for all businesses in this industry. CSFs could also differ from firm to firm, and from manager to manager (Caralli, 2004).

There are many levels of management in a typical organization, each of which may have vastly different operating environments. For example, executive-level managers may have CSF such as managing strategic relationships with business partners; and line-level managers may have CSF such as training employees (Caralli, 2004). Once a firm has identified its CSFs, it should properly maintain and manage those factors to compete successfully in a particular industry (Leidecker

Marketing activities and firm performance

Performance of firms is influenced by various marketing activities (Forman and Hunt, 2005). Marketing activities facilitate firms to exploit opportunities and satisfy customer needs. Marketing activities influence various performance measures such as customer acquisition, satisfaction, and retention, and financial performance (for example; revenue, profit) (Katsikeas et al., 2016; Kim and Ko, 2011).

Firms can recognize and exploit opportunities to more efficiently or effectively serve customer needs through the implementation of marketing activities (Webb et al., 2010). The competitive environment of modern day firms necessitates the successful implementation of marketing activities (Appiah-Adu et al., 2001). Through efficient implementation of marketing activities, firms respond effectively to changes in the needs of customers (Holcombe, 2003). Moreover, marketing activities build long-term assets of firms such as brand equity (Rust et al., 2004).

Literature has identified marketing activities that increase performance (Scott-Young and Samson, 2008). The importance of marketing activities depends on the objectives, the strategy and the implementation capabilities of the firm (Mokhtar et al., 2009). Those marketing activities that significantly contribute to firm performance should receive high priority (Kumar et al., 2011). Identifying marketing activities as CSFs is crucial for marketers to obtain budget for their implementation (Morgan, 2012).

Research in marketing has increasingly focused on building knowledge about how firms' marketing activities contribute to performance outcomes. In the context of small firms in the US, Dunn et al. (1986) identified key marketing activities. These activities relate to product (planning, schedules, service), sales (general sales, control, forecast, training, recruiting), control (inventory, quality), relations (customers, dealers, public), market research, pricing, advertising, warehousing, packaging, and credit extension.

Siu (2002) explored to what extent internet-based and traditional small firms in Taiwan differ in the execution of these marketing activities (Dunn et al., 1986). He found that both internet-based and traditional small firms focus on sales, product planning, and customer relationships. However, traditional firms emphasize quality control, while their internet-based counterparts focus more on dealer relationships and sales forecasts. This demonstrates similarities and differences of marketing activities as CSFs across firm types.

Cooper and Kleinschmidt (1993) considered market assessment (study), product and customer tests, and technical assessment as CSFs for new product development success. Marketing activities such as targeting strategy, quality product, employees training, pricing mechanisms, and product promotion were used to explain small firms overall business performance in the UK (Wood, 2006).

Market orientation and marketing activities

Literature presents strong evidence for the positive contribution of market orientation to firm performance (Cano et al., 2004; Kirca et al., 2005). Market orientation provides a business with a better understanding of its customers, competitors, and environment, which subsequently leads to superior performance (Kirca et al., 2005). Market orientation urges employees to develop and exploit market information to create and maintain superior customer value (Narver and Slater, 1990).

In this study, we view market orientation as the extent to which culture is devoted to meeting customers' needs and outperforming competitors (Narver and Slater, 1990). Market-oriented firms implement marketing activities to achieve their objectives (for example, satisfaction of their customers). Market orientation influences performance through effective implementation of marketing activities (Hult et al., 2005). Han et al. (1998) explained that market orientation remains incomplete if it is not understood through which activities a market-oriented culture is transformed into superior value for customers.

Market-oriented culture of a firm embodies values and beliefs that guide organizational activities that enhance performance (Langerak et al., 2004), and provides a unifying focus for the efforts and projects of individuals and departments within organizations (Baker and Sinkula, 1999). Market orientation culture motivates and inspires the implementation of various marketing activities, which eventually influences firm performance (Atuahene-Gima, 1996; Gatignon and Xuereb, 1997; Jorge et al., 2012; Langerak et al., 2004; Moorman, 1995).

The influential body of literature in the field of strategic management emphasizes the importance of firm resources and their implications for firm performance, which is a basis for the resource-based view (RBV). Firm resources include both tangible (physical) assets (for example; machines, buildings, labor) and non-tangible (non-physical) assets (for example; information, knowledge, reputation) (Teece et al., 1997). RBV deals with how a firm's resources influence performance (Hult et al., 2005).

Firms need to access resources to implement marketing activities and increase positional advantage, which in turn enhances performance (Ketchen et al., 2007). RBV suggests that a firm has a foundation for a sustained competitive advantage if its resources provide value to customers, are superior to those of competitors, and are difficult to imitate or substitute (Barney, 1991).

However, RBV is criticized as it lacks to explain how resources are developed and deployed to achieve competitive advantage, and it does not consider the impact of dynamic market environments (Lengnick-Hall and Wolff, 1999; Priem and Bulter, 2001).

To address these limitations, the dynamic capabilities view (DCV) is proposed (Newbert, 2007). Scholars of the DCV extend RBV to examine the influence of dynamic markets (Helfat and Peteraf, 2003). According to Teece et al. (1997), dynamic capability is defined as "the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments."

The DCV posits that since marketplaces are dynamic, what explains interfirm performance variance over time is the capabilities by which firms' resources are acquired and deployed in ways that match the firm's market environment (Eisenhardt and Martin, 2000; Makadok, 2001). The dynamic capabilities of the firm should be better than its counterparts to perform well in the market place (Bingham et al., 2007).

Teece et al. (1997) describe that capabilities are dynamic when they enable the firm to implement new strategies to reflect changing market conditions by combining and transforming available resources in new and different ways. Based on RBV and DCV, our argument is that marketing activities require resources and capabilities if its value to the firm is to be fully realized (Dutta et al., 2005; Morgan et al., 2009).

Prior studies integrate RBV of the firm and the DC perspective with marketing theory (Bharadwaj et al., 1993). Not all firms are able to generate and sustain competitive advantage by implementing a market orientation (Day, 1994; Hunt and Morgan, 1995). Those market-oriented firms that enable the use of their resources effectively and efficiently could implement marketing activities, which eventually provide greater improvement for firm performance.

Market orientation, in isolation, is unlikely to qualify as dynamic capability; it needs to be complemented by other internal resources that will lift its competitive value (Menguc and Auh, 2006; Moorman and Slotegraaf, 1999). Market orientation encourages firms to use their capabilities to coordinate resources (for example, employees) in order to better serve customers (Hult et al., 2005). To perform marketing activities effectively and efficiently firms need resources and capabilities to coordinate those resources.

Literature reveals that market orientation inspires the execution of various marketing activities (Jorge et al., 2012) facilitated by the firm's resources and capabilities (Menguc and Auh, 2006). The way how firms execute these marketing activities affects performance. This is governed by the level of intensity and quality of execution of the marketing activities. The intensity of execution refers to what degree the firms are practicing marketing activities (that is, frequency); whereas the quality of execution refers to the way in which firms are practicing marketing activities (that is, how good they do it). Higher execution of intensity and quality could lead to higher firm performance.

There is a positive association between market orientation components and performance in the Ethiopian SPCs context. The present study augments this work by identifying the specific marketing activities that drive firm performance. The performance of SPCs is influenced by the effective and efficient execution of marketing activities both in terms of intensity and quality. The effective execution of marketing activities requires resources and capabilities. Market orientation in the Ethiopian SPCs context comprises customer orientation, competitor orientation, interfunctional coordination, and supplier orientation. Performance includes customer satisfaction, financial performance, and members' livelihood performance.

In Figure 1, we show a conceptual framework relating market orientation, and the intensity and quality of execution of marketing activities, to outcomes. The expectation of this relationship is that market orientation stimulates SPCs to execute key marketing activities (both in terms of intensity and quality), and the effective execution of these activities eventually influences performance.

METHODOLOGY

Seed producer cooperatives categorization

Data were collected from 24 SPCs in Ethiopia. These SPCs were selected based on the assessment of the market orientation-performance relationship and profiled in terms of self-rated level of marketing orientation and performance. Based on these self-assessments, SPCs were priori classified into two distinct groups:

(1) High market orientation and high performance (11 SPCs) that is, high performing SPCs; and
(2) Low market orientation and low performance (13 SPCs) that is, low performing SPCs. Classification was based on the median scores for market orientation and overall performance.

Sample selection

Data were obtained from experts, selected on the basis of their experience with and knowledge of the marketing activities and performance of the 24 SPCs included in the study. We identified experts that are experienced with seed business in Ethiopia and have an in-depth understanding on the SPCs. Experts included three university instructors who have many years of teaching and research experience and participated in seed projects to support SPCs, 13 project officers (from seed business projects and NGOs) who are among the best experts in sustainable seed business development of SPCs in Ethiopia, and three experienced local experts closely working with SPCs. Of the 19 experts involved, sixteen hold an MSc degree and three a BSc degree in the field of agribusiness, cooperative marketing, economics or seed sciences.

Procedure

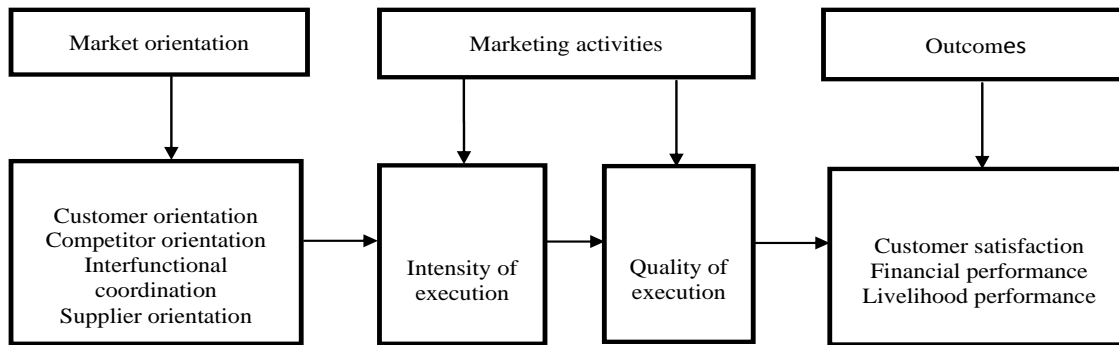Experts were contacted in person and by telephone, and asked to

Figure 1. Conceptual framework.

participate in the research. Those that agreed were further briefed about the objective of the research, the reason why they were selected to participate in the study, and reassured about the anonymity of their responses. Then, the questionnaires were handed over to the experts either during face-to-face contact or via mail. To ensure timely completion, help and reminders were given via regular telephone communication. Experts were identified from different organizations that are working with SPCs. Experts evaluated a specific SPC only when they were familiar with its marketing activities and performance. As a result each SPC was evaluated by one to four experts, and mostly by two experts. A total of 52 questionnaires across the 24 SPCs was obtained.

Measures

Marketing activities

Specific marketing activities were identified that relate to the market orientation of SPCs. Prior research reported that supplier orientation next to customer orientation, competitor orientation, and interfunctional coordination are defining factors of market orientation practices among Ethiopian SPCs.

Initially, a gross list of marketing activities was identified based on literature review and SPCs' experience. Marketing activities that were identified from literature ranged from activities limited to the specific firm (that is, in-house product testing) to activities that are broadly applicable to most firms (that is, quality control).

Further, a number of specific marketing activities were considered that the Ethiopian SPCs are practicing based on the previous study. Experienced experts were consulted to comment on the proposed list of marketing activities taken from the literature and local practices. A series of consultations with experts helped to identify and remove those marketing activities that could not sufficiently represent the SPCs context (for example, market research) and that were found redundant and having similar meaning.

As a result, the process identified 15 marketing activities potentially related to performance of the SPCs in Ethiopia, and these were categorized under the four components of market orientation. *Customer orientation* included five marketing activities, namely

(1) Quality control of product (seed)
(2) Collection of information on customer needs
(3) Assessment (verification) of customers' satisfaction
(4) Responsiveness to customer needs and complaints (volume, diversification), and
(5) Direct customer visits to maintain customer relations.

Competitor orientation comprised three marketing activities, namely

(1) Differentiation of product from competitors
(2) Collection of information on competitors' activities, and
(3) Responsiveness to competitive actions (pricing).

Interfunctional coordination included five marketing activities, namely

(1) Their leaders motivating committees and members
(2) Committees' communication and integration
(3) Sharing of information within the cooperative
(4) Their leaders integrating activities, and
(5) Inter-committee discussion on market trends and developments.

Supplier orientation involved two marketing activities, namely

(1) Meeting with suppliers for opportunities (approach suppliers), and
(2) Maintaining relationships with suppliers (supplier relations).

For all, 15 marketing activities experts rated the intensity and quality of execution. Intensity of execution of marketing activities was defined as the frequency with which an SPC practices the marketing activity and was rated on a five-point Likert scale with scale points rated as never, seldom, sometimes, often and constantly. Quality of execution of marketing activities was defined as the way in which an SPC implements the marketing activity, measured on a five-point Likert scale with scale points rated as poor, fair, satisfactory, good and excellent.

After rating the marketing activities on their intensity and quality of execution, experts were asked in open response format to elaborate on their ratings by explaining the current practices of the specific SPCs. Experts described the behaviours of the SPCs for each of the marketing activities. Moreover, they were asked to suggest areas of improvement that the SPCs should consider in order to improve their performance. The qualitative data were aggregated into the four components of market orientation.

Performance

Expert ratings of SPC performance were collected to validate the a priori classification on self-rated performance. Performance was measured on 11 performance indicators categorized under three dimensions based on previous research: customer satisfaction, financial performance, and members' livelihood performance.

The first two performance measures were adapted from the marketing literature and the latter performance measure was based

Table 1. Effect and pattern of intensity and quality of execution.

Effect		Value	F	Hypothesis df	Error df	Sig.
I_Q	Roy's largest root	0.854	18.787	1	22	0.000
I_Q*group	Roy's largest root	0.472	10.390	1	22	0.004
item	Roy's largest root	28.529	18.340	14	9	0.000
item*group	Roy's largest root	4.397	2.827	14	9	0.006
I_Q*item	Roy's largest root	0.747	0.480	14	9	0.894
I_Q*item*group	Roy's largest root	1.581	1.016	14	9	0.507
Group		-	44.03	1	22	0.000

NB: I=intensity; Q=quality; item=marketing activity; group=high and low performing groups.

on the current practices of Ethiopian SPCs. Financial performance and customer satisfaction are the two most prominent business performance measures in marketing studies (Boohene et al., 2012; Hilal and Mubarak, 2014).

Livelihood performance is associated with cooperative business objectives in the D&E economies. *Customer satisfaction* was measured with four indicators:

(1) Customers getting (acquiring) the quality seed they want
(2) Receiving positive feedback from customers
(3) Customers' intention to buy the seed from the firm, and
(4) Customers repeat purchasing the seed.

Financial performance included four indicators, namely

(1) The firm increasing its assets
(2) The firm increasing its market share
(3) The firm shows progress in capital improvement, and
(4) The firm increasing its net profit.

Members' livelihood performance was measured with three indicators, namely

(1) Members' family having sufficient food throughout the year
(2) Improvement in the quality of members' house, and
(3) Members having basic (necessary) household equipment.

The performance measures were assessed on a five-point Likert scale with scale points rated as strongly disagree, disagree, neutral/uncertain, agree and strongly agree.

Data analysis

Quantitative and qualitative procedures were employed in data analysis. Repeated measures analysis of variance was used to assess the association between the intensity and quality of execution of the marketing activities among high and low performing SPCs. Analysis of variance was also used to assess the difference between high and low performing groups for implementation of marketing activities. Comparisons between the high and low performing groups were based on two sample *t*-tests. Expert-based performance measures for the two groups were similarly compared between the two groups by means of two sample *t*-test. To complement the quantitative analysis, qualitative experts' judgements (elaborations and suggestions) were summarized and aggregated on the basis of the four components of market orientation. We assessed the similarities and differences of the two groups in the execution of the marketing activities, and specific recommendations of the experts. Statistical package for social sciences (SPSS) software was used for data analyses.

RESULTS

Comparison of intensity and quality execution of marketing activities

As each expert provided multiple ratings, the associations between the intensity and quality of execution of marketing activities both for high and low performing SPCs were assessed using repeated measures ANOVA based on the averaged data per SPC.

Results (reported in Table 1) show the main and interaction effects for intensity versus quality ratings (I_Q), the different marketing activities (item), and the high versus low performing groups of SPCs (group). The scores for intensity and quality of execution in the Ethiopian SPCs are significantly different overall (F=18.787; *p*<0.000) reflecting the different response scales for intensity and quality.

The scores of intensity and quality of execution also significantly differ between the high and low performing SPCs (F=10.39; *p*=0.004) showing that the difference between intensity and quality is not equal between the two groups. The scores between marketing activities are significantly different (F=18.34; *p*<0.000; Figure 2) indicating that the influence of various marketing activities differs. The differences among marketing activities are also significantly different between the high and low performing SPCs (F=2.827; *p*=0.006). However, the results also show that the patterns of intensity versus quality of execution ratings do not differ across the marketing activities (F=0.480; *p*=0.894) and that these do not differ between the high and low performing groups of SPCs (F=1.016; *p*=0.507).

Together these results show that ratings of quality of execution do not provide unique information compared to those on intensity of execution (and vice versa). This may indicate that intensity of practice increased goes hand in hand with quality of execution. Hence, we further only discuss the intensity of execution of marketing activities between high and low performing groups of SPCs. Results also illustrate the significant differences between the two groups (F=44.03; p<0.000) regarding the implementation of the marketing activities.
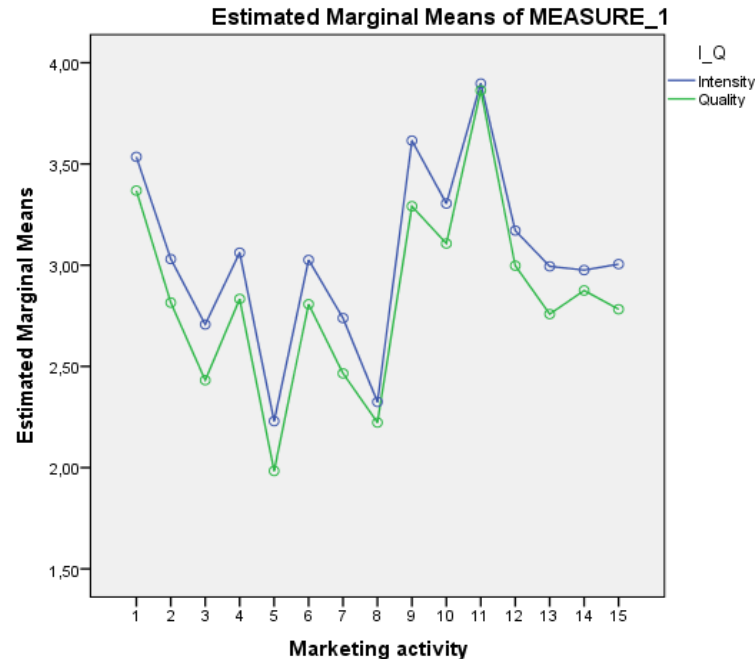
Figure 2. Overall association between intensity and quality of execution

Intensity of execution of marketing activities

Table 2 compares the similarities and differences between high and low performing SPCs in terms of the intensity with which marketing activities are executed. The results show that, for almost all marketing activities, high performing SPCs outperform low performing SPCs in terms of intensity with which these marketing activities are being implemented. However, from the mean ratings (5 point scale) it is evident that some of the key marketing activities are more common than others.

For customer orientation, high performing SPCs conduct quality control to improve seed on a regular basis as well as collecting and responding to customer information. However, direct customer intimacy, through direct visits to customers is much less common. This indicates that Ethiopian SPCs have limited experience in direct customer visit regardless of their level of performance. Despite these varying levels of implementation intensity, all customer related marketing activities significantly differentiate high performing SPCs from their low(er) performing counterparts. Concerning competitor orientation, all competitor related marketing activities are significantly different between high and low performing SPCs. High performing SPCs make efforts to differentiate their products and collect competitor information.

However, responding to competitive actions (that is, pricing) is uncommon. Low performing SPCs generally show lower frequency of implementation in competitor related marketing activities than other marketing activities associated with customers, internal coordination and suppliers. All, except sharing information, interfunctional coordination related marketing activities significantly differentiate high performing SPCs from low performing SPCs. High performing SPCs often perform better in motivating members, interdepartmental communication, and integrating activities than low performing SPCs.

Social networks and strong cultural practices assure that both high and low performing SPCs are effective in sharing of information within the firm. In general Ethiopian SPCs show more marketing activities related to interfunctional coordination than marketing activities associated with customers, competitors and suppliers. Supplier related marketing activities significantly differentiate high performing SPCs from low performing SPCs. High performing SPCs often meet and approach suppliers and make an effort to maintain relationships with suppliers. Low performing SPCs seldom have contact with suppliers. This indicates better performing capacity (network, external contact) of high performing SPCs than low performing SPCs to access the necessary inputs particularly basic seed.

Experts' judgement on SPCs' performance

Table 3 shows that the expert judgments on performance by and large confirm the self-rated performance by the SPCs. Significant differences exist between the two

Table 2. Intensity of execution of marketing activities between the two groups.

Variable	Performance		Two sample *t*-test results		Effect size
	High(n=11) mean(SD)	Low(n=13) mean(SD)	*t*(df=22)	*P* value	
Customer orientation					
Quality control of product (seed)	4.03 (0.47)	3.03 (0.64)	4.392	0.000	1.00
Collection of information on customer needs	3.52 (0.55)	2.54 (0.44)	4.717	0.000	0.98
Assessment (verification) of customers' satisfaction	3.03 (0.47)	2.38 (0.51)	3.229	0.004	0.65
Responsiveness to customer needs and complaints (volume, diversification)	3.47 (0.48)	2.65 (0.52)	3.999	0.001	0.82
Direct customer visits to maintain customer relations	2.52 (0.64)	1.94 (0.48)	2.504	0.022	0.58
Competitor orientation					
Differentiation of product from competitors	3.62 (0.38)	2.42 (0.67)	5.283	0.000	1.20
Collection of information on competitors' activities	3.26 (0.74)	2.21 (0.43)	4.334	0.000	1.05
Respond to competitive actions (pricing)	2.59 (0.49)	2.06 (0.61)	2.364	0.027	0.53
Interfunctional coordination					
Their leaders motivating committees and members	4.28 (0.61)	2.94 (0.74)	4.912	0.000	1.34
Committees' communication and integration	3.96 (0.72)	2.65 (0.58)	4.849	0.000	1.31
Sharing of information within the cooperative	4.00 (0.10)	3.79 (0.39)	1.709	0.102	0.21
Their leaders integrating activities	3.48 (0.61)	2.86 (0.39)	2.952	0.007	0.62
Inter-committee discussion on market trends and development	3.38 (0.42)	2.61 (0.54)	3.926	0.001	0.77
Supplier orientation					
Meeting with suppliers for opportunities (approach suppliers)	3.48 (0.55)	2.47 (0.80)	3.599	0.002	1.01
Maintaining relationships with suppliers (supplier relations)	3.57 (0.57)	2.44 (0.95)	3.555	0.002	1.13

n=number of SPCs.

groups for all performance measures (customer satisfaction, financial performance, and members' livelihood improvement). The largest differences were observed for financial performance con-firming that high performing SPCs are better in financial capabilities than low performing SPCs. In particular, a big difference was observed between the two groups for increased market share (volume of seed sold), which indicates the better capabilities of high performing SPCs in supplying larger quantity of higher quality seed into the market than low performing SPCs. Low performing SPCs exhibit lower capital improvement and lower net profit gain than high performing SPCs. Considerable differences were also observed between the two groups for measures of customer satisfaction particularly for perceived quality seed. For the case of members' livelihood improvement, the highest difference was observed for having sufficient food throughout the year. Both groups performed well in increasing their assets.

Further elaboration by experts

This section summarizes experts' more detailed qualitative information on why and how high

Table 3. Comparisons between the two groups in terms of performance based on experts judgement.

Variable	Performance		Two sample *t*-test results		Effect size
	High(n=11) mean(SD)	Low(n=13) mean(SD)	*t*(df=22)	*P* value	
Customer satisfaction					
Customers getting (acquiring) the quality seed they want	4.04 (0.33)	3.23 (0.43)	5.172	0.000	0.81
Receiving positive feedback from customers	3.91 (0.49)	3.26 (0.55)	3.045	0.006	0.65
Customers' intention to buy the seed from the firm	3.62 (0.73)	2.74 (0.91)	2.618	0.016	0.88
Customers repeat purchasing the seed	3.86 (0.64)	2.85 (0.75)	3.553	0.002	1.01
Financial performance					
The firm increasing its assets	4.28 (0.45)	3.03 (0.69)	5.272	0.000	1.25
The firm increasing its market share	4.16 (0.55)	2.83 (0.61)	5.583	0.000	1.33
The firm shows progress in capital improvement	3.91 (0.53)	2.75 (0.69)	5.061	0.000	1.16
The firm increasing its net profit	3.96 (0.56)	2.75 (0.69)	4.733	0.000	1.21
Livelihood performance					
Members' family having sufficient food throughout the year	4.04 (0.72)	2.89 (0.48)	4.483	0.000	1.15
Improvement in the quality of members' house	4.01 (0.59)	3.26 (0.55)	3.214	0.004	0.75
Members having basic (necessary) household equipment	3.81 (0.39)	3.27 (0.35)	3.524	0.002	0.54

n=number of SPCs.

performing SPCs executed the marketing activities better and more frequently than low performing SPCs. In addition, we present experts' specific suggestions on how SPCs might practice activities in order to improve their performance.

Customer orientation

In relation to customer orientation related marketing activities, experts emphasised that SPCs traditionally have quality control committees (or a sort of responsible body) in place for implementing quality control of product (seed). Compared to low performing SPCs, high performing SPCs are typically characterised by more capable and better experienced committees with clear tasks and responsibilities, and members with more technical skills. They also have strong internal bylaws to maintain the seed quality that their members must follow showing high performing SPCs have better capabilities of internal management.

Experts highlighted that high performing SPCs manage to get access to high quality basic seed from suppliers, implement better agricultural technologies and practices, and more often work with an external quality assurance agency. Also, whereas low performing SPCs tend to rely entirely on externals as a source of customer needs, high performance SPCs augment such knowledge through direct contacts with final buyers (customers) using formal and informal approaches. Experts described that high performing SPCs sometimes directly visit customers' field to get feedback or acquire feedback via telephone. However, SPCs do not have sufficient experience to assess customers' satisfaction in more formal ways.

Experts emphasize the importance of accurate information about the needs of prospective buyers (customers) before the start of seed production. Therefore, experts suggest all SPCs should visit their customers and use all the possible mechanisms (both formal and informal) to assess the level of their customers' satisfaction. Experts advised for SPCs to visit their customer farmers field to receive direct feedback. In particular low performing SPCs should focus on the strengthening of their internal seed quality control mechanisms, closely working with external seed quality assurance agencies, and increase the seed production skills of their members through trainings.

Competitor orientation

Concerning competitor orientation related marketing activities, experts agreed that most SPCs commonly produce only a few types of crops or varieties (for example, bread wheat, tef). However, experts also mentioned that most high performing SPCs are capable in, and have better experience of, producing diversified crops and varieties and/or unique crops (for example, onion, haricot bean, hybrid maize, pulse crops etc.) than low performing SPCs.

According to experts, these unique crops have high local and international market demand. Experts also indicted that high performing SPCs produce seeds that require high skills and effective coordination, something that their lower performing competitors cannot achieve easily. A few of the high performing SPCs, according to experts, engage in seed value addition activities and fulfil the legal seed quality certification standards; but both high and low performing SPCs lack defined strategies to differentiate themselves from what competitors do.

Experts described that high performing SPCs are trying to access competitors' information through secondary sources, but that most low performing SPCs do not bother about competition. In general Ethiopian SPCs accidentally gather information about competitors during various formal and informal events such as in workshops, local administrative meetings, field days, exhibitions, seed fairs, religious and local festivities. Experts mentioned price adjustment and large volume seed supply are some of the activities that high performing SPCs practice to respond for competitive actions. Experts agreed that Ethiopian SPCs do not perform as expected on competitor-oriented marketing activities compared to other activities related to customers, internal coordination and suppliers.

In this regard, experts highlight the consideration of competitor-related marketing activities if SPCs want to perform well in the market. Hence, the suggestions of experts for low performing SPCs are that they should include unique crop seed (for example, onion, haricot bean, hybrid maize, pulse crops etc.) in their production

portfolios and train their members to have special skills to produce and maintain the seed quality according to the standards. They should also clearly know first their target competitors and design specific responsive mechanisms.

The specific mechanisms include price adjustment, seed value addition activities, and the production of crops that have high local demand and for which big companies have low interest. Leaders of low performing SPCs should approach partner organizations to acquire knowledge to identify their competitors. In specific, Ethiopian SPCs should develop strategies to assess precise information about their competitors using various mechanisms executed by themselves and through partners in the network. They should also develop adaptation strategy to tackle the competitors' actions.

Interfunctional coordination

For interfunctional coordination related marketing activities, experts underlined that the vast majority of leaders in high performing SPCs are capable of motivating members and committees through official recognition, awards and financial rewards (for example, money, farm tools, certificates).

According to experts' elaboration, the capacities of leaders from high performing SPCs are associated with their higher level of commitment, dedication, experience, and skills than that of leaders from low performing SPCs. Low performing SPCs do not reward members and they have limited experience with informal ways to giving recognition. Leaders of high performing SPCs provide members access to inputs (basic seed), which is an effective motivator for members.

Experts mentioned that high performing SPCs usually do have more specialized committees with clear tasks and responsibilities than low performing SPCs indicating more specialization and a higher need of integrate the activities. High performing SPCs also assign specific tasks to appropriate committees and/or individual members, and constantly oversee those tasks.

Experts also described that in the majority of high performing SPCs, there are regular meetings among leaders (almost every two weeks), and among various committees (almost every month), which reflects the good communications between committees. They discuss various seed business issues including what they should produce, where and how to sell the seed, the volume and quality of seed, price mechanisms, customer handling and relationships, seed value additions, and access to basic seed from suppliers.

In low performing SPCs leaders meet irregularly, not frequently, and in some cases don't meet for several months. Experts agreed that both groups of SPCs perform well in sharing information driven by strong cultural practice in the community. Experts highlighted that most high performing SPCs have well-developed plans (year

and/or multiple year planning) which is absent in the majority of low performing SPCs.

According to experts' suggestions, low performing SPCs should assign leaders that have commitment, dedication, experience, and skills to coordinate activities. Experts stressed that low performing SPCs should take lessons from high performing SPCs and implement specialised committees and guarantee connectedness between them, increase the frequency of committee meetings, and discuss critical market developments and trend. Rewards have social value in the rural community, so low performing SPCs should practice to acknowledge the efforts of leaders and their members through various reward mechanisms for better motivation. For high performing SPCs, experts suggested that they should recruit professional managers to minimize the leaders' work load and cherish their commitment.

Supplier orientation

Regarding supplier orientation related marketing activities, experts described that high performing SPCs have direct and frequent contact with suppliers. However, in the low performing SPCs contact with suppliers is mostly limited to when they need basic seed during planting time. Experts underlined the efforts of high performing SPCs to request support from other stakeholders (research institutes, GOs and NGOs) to maintain their relationship with suppliers. They often approach and negotiate with suppliers to access inputs ahead of planting time.

Experts emphasised that high performing SPCs often work in contractual seed production and marketing arrangements with suppliers, other big seed enterprises and seed unions, which helps them to secure the basic seed and maintain the relationship. Experts described that high performing SPCs have good experience in working with research institutes and suppliers during seed (varieties) testing and demonstrations. In most cases, suppliers consider high performing SPCs as their strategic and loyal partners. Low performing SPCs are largely dependent on external support to access inputs (particularly basic seed) from suppliers.

In terms of suggestions, experts emphasised that all SPCs should review periodically their relationships with suppliers and plan actions when improvements are needed. In particular for low performing SPCs, experts recommended that they should approach suppliers not only to obtain seed, but focus also on long-term relationships, and meet frequently to develop good firm-supplier relationship. Moreover, they should signal their demand ahead of time and should avail themselves as strategic partners for suppliers in joint seed demonstration and production activities. For high performing SPCs, experts suggested that they should clearly consider supplier relations as part of their business strategy as

suppliers can influence the quality, timeliness and competitiveness of their product. Since a few seed suppliers are found in Ethiopia, experts advised SPCs to be patient and keep their relationship with suppliers even sometimes suppliers are not able to keep their promise.

DISCUSSION

The study findings reveal that the performance of SPCs is influenced by effectively and efficiently implementing marketing activities identified as CSFs. High performing SPCs implemented marketing activities more and better than low performing SPCs, which suggests that these marketing activities are CSFs. These marketing activities can be managed by SPCs themselves. The finding shows that effective implementation of marketing activities remains a key strategy for SPCs to improve their performance.

In extant literature in marketing and strategic management (Morgan et al., 2009), it is suggested that market orientation inspires the implementation of marketing activities based on the resources that firms have and their capabilities to coordinate these resources effectively and efficiently. Our findings of a significant difference between high and low performing SPCs in implementation of these marketing activities is consistent with this view. Most high performing SPCs have strong leaders, members with better knowledge and skills, and have better external linkage with suppliers and other supporting organizations than low performing SPCs. These, in turn, help them to give special attention and devote their resources to the implementation of the key marketing activities.

The findings of this study show a strong association between intensity and quality of execution of marketing activities in the current Ethiopian SPCs context. More specifically, contrary to our expectation, the study does not support the significant difference between intensity and quality of execution for marketing activity in SPCs context. The patterns of intensity and quality of implementation of marketing activities are found to largely overlap. One possible explanation for absence of a significant difference between intensity and quality of execution is that intensity of execution ultimately results in quality of execution. In other words, for the current SPCs, we do not find unique contributions to performance of quality of execution over and above intensity of execution of marketing activities. It may be that the intensity of execution increases the quality of execution. In the current Ethiopian SPCs situation, the implementation frequency of the marketing activities is considered as very important rather than quality of implementation.

As reported in the literature (Carmeli et al., 2010; Kouzes and Posner, 2012; Puni et al., 2014), the role of mangers (leaders) is indispensable for the implementation

of marketing activities and thus to ensure firm performance. Our findings indicate that leadership quality of SPCs differentiates SPCs in effective implementation of marketing activities and consequently in performance. Empowered leadership is the base for the success of the business.

In the case of SPCs, the role of cooperative leaders is an important element that has a significant impact on business culture. The leader's commitment, motivation, and experience determines the efficient way of integrating various firm resources and activities. Leaders' motivation could attract members in and inspire members to committing themselves to the success of the business. The considerable variation among Ethiopian SPCs depends on the knowledge and experience of leaders, which can foster or inhibit the development of cooperative's success (Subedi and Borman, 2013).

The role of leaders (top management) would help a firm to achieve its objectives (Jaworski and Kohli, 1993). The implementation of customer-focused marketing activities contributes to SPCs performance. The proper imple-mentation of marketing activities that related to customer orientation could help SPCs to create and maintain high value products for customers. SPCs that develop and strengthen their customer-focused marketing activities also increase their customers' satisfaction, market share and profit (Chi and Gursoy, 2009).

As the firm can satisfy its customers, the willingness of customers to pay for the product increases which eventually improves the performance of the firm. This confirms the effect of customer-focused marketing activities on the various performance measures (Joung et al., 2015; Lings and Greenley, 2010). However, SPCs' performance on direct customer visits (customer relations) is low. Visiting customers, to offer them adequate after-sales service, is a major generator of revenue, profit and competency in modern competitive markets (Cohen and Kunreuther, 2007; Cohen et al., 2006).

Nevertheless, in most cases, SPCs do not have experience in after-sales service which is a common limitation of small businesses and marketing cooperatives in D&E economies. SPCs should give priority to customer-focused marketing activities, which also is the main concern for IOFs.

Significant variations were observed between high and low performing SPCs in supplying the large quantities of higher quality seed to the market that customers need. Quality seeds in this context refers to seeds that have desirable agronomic (for example, yield) and quality (for example, colour, texture, size) attributes that final customers (farmers) want (Thijssen et al., 2008). Seed is a complex business that requires special skills, experience and high level of commitment to provide quality seed for customers. It is closely interlinked with the farm management skills of member farmers and leaders' commitment in motivating members and integrating various activities. The knowledge and skills on seed production techniques are the determinant factors for the better performance of SPCs (Subedi and Borman, 2013).

In general Ethiopian SPCs show little marketing activities associated with competition, though we found significant variations between high and low performing SPCs in implementing competitor-focused marketing activities. Low performing SPCs do not bother about competitors and have very limited practices in competitor-related marketing activities. Concerning price, for example, they do not try to set the seed price by considering competitors' price. High performing SPCs have experience in supplying diversified and unique crops (seeds) indicating their attempt to differentiate products. SPCs need to pay attention to competition, if they want to perform well in competitive markets.

To improve performance, SPCs should develop better relationship with suppliers. Our findings show that, in general, high performing SPCs have better relationships with input suppliers (i.e. in particular basic seed) than low performing SPCs. In seed business context of D&E economies like Ethiopia where the public organizations are responsible for development of new seeds, basic seed shortage is a major challenge both for small as well as large seed enterprises. Without reliable seed supply sources, it is difficult to continue a smooth operation of the seed business. Thus, for SPCs approaching and working with these seed suppliers is the only possible solution to access seed. SPCs having strong relationships with suppliers can enhance their market share and meet the quality standards set forth to satisfy the needs of their customers. The activities of the firms towards supplier orientation can improve their marketing activities and enhance performance (Asare et al., 2013; Hassan et al., 2014; Schiele, 2012).

The non-significant difference between high and low performing SPCs in sharing information within the cooperative shows the presence of common cultural practices of SPCs in this regard. SPCs practice sharing information regardless of their level of performance. The most probable explanation for this is that the presence of high social network and high level of embeddedness culture in the study context i.e. which is a typical feature of D&E economies (Steenkamp, 2005). Members of the cooperatives share information using both formal and informal mechanisms. Since members are living in the same village and have common social interests, they use all the possible opportunities (religious festivities, social gatherings etc.) for sharing information.

CONCLUSION

This study shows a clear difference between high and low performing SPCs in the implementation of marketing activities revealing marketing activities as CSFs. The strong association between intensity and quality of

execution for individual marketing activities shows that intensity results in quality of execution in the Ethiopian SPCs context. The effect of intensity and quality cannot be disentangled in the Ethiopian SPCs context.

Low performing SPCs implement marketing activities less frequently than high performing SPCs, except for sharing information within the SPCs, which is a common practice for all SPCs regardless of their level of performance. In general, Ethiopian SPCs performed well on marketing activities related to interfunctional co-ordination, but poorly implemented activities associated with competitor orientation.

The study reveals that the implementation of key marketing activities is crucial for the sustainable competitive advantage of SPCs in Ethiopia. Our findings suggest that SPCs are likely to perform better if they use a variety of marketing activities focussed on customers, suppliers and competitors and inter-committees integration.

More specifically, Ethiopian SPCs have to give due attention to the implementation of marketing activities related to quality control, product diversification, assessment of customers and competitors, motivation and integration of activities by leaders, and maintenance of relations with suppliers.

Hence, the study lends support to the assertion that SPCs need to strengthen their capabilities to combine and coordinate their resources in an efficient way in order to execute the marketing activities. Moreover, government organizations, NGOs and seed related projects could play an important role in strengthening the capabilities of the SPCs to perform marketing activities that enhance their performance.

MANAGERIAL IMPLICATIONS

The current study has several managerial implications for SPCs, government organizations, NGOs, seed related development projects, and policy (decision) makers. It identifies key marketing activities that can strengthen the performance of Ethiopian SPCs.

First, SPCs should focus on the key marketing activities that have significant contribution to their performance. These activities could be controllable and managed by SPCs themselves. Thus, they should adjust their internal strengths and capabilities to the external opportunities. Second, marketing activities of SPCs related to competition are minimal.

The emergence of other seed producers (seed co-operatives, seed unions, private seed companies, public seed enterprises) is a challenge for the success of the cooperatives' seed business. They should realize that they are in a dynamic and competitive market environment.

Hence, SPCs should understand the influence of competitors and give due attention to those marketing activities. Third, government organizations, NGOs and

seed related projects play an important role in strengthening the capacity of the SPCs. They should consider the marketing activities identified in this study as CSFs. Government organizations should give special consideration to SPCs in accessing basic seed from suppliers considering their key contribution in improving the seed security of the country at large and serving the farming community in particular.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The study has limitations that should be addressed. It was conducted among small seed cooperatives in the Ethiopian context and the marketing activities may only be CSFs for this specific business environment. Hence, it would be worth to conduct cross-cooperative sector studies. This study also used expert judgement which can be considered (more) objective. However, it is suggested that future research may consider more objective criteria to complement.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Story beneath story: Do magazine articles reveal forthcoming returns on stock market?

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The study attempts to investigate the relation between news articles and stock returns, focusing on immediate impact of Pak and Gulf Economist articles. It endeavors to figure out whether such quantification of news articles has a relation with Karachi Stock Exchange (KSE)-100 index. Sample comprised of 511 words picked manually for analysis from 760 weekly issues of Pak and Gulf Economist. Correlation and regression analysis was applied to word indices and KSE excess returns for a period of 16 years from 1999 to 2014. Main finding was that words were not only correlated with KSE- excess returns rather they also had a causal relation with index. Augmenting benchmark models with word indices enhanced the forecasting power of those models.

Key words: Behavioral finance, Karachi Stock Exchange (KSE)-100 index, text mining, R-word index, word count index, efficient markets.

INTRODUCTION

Premises and background factors necessitating need for this study

The principle behind market efficiency is that security prices incorporate all relevant information. Fama (1991) was the first to distinguish three forms of efficiency. The traditional efficient market hypothesis posits that ongoing stock prices have already taken into account the information from all sources.

This view received a serious setback during some major financial crunches. That was when researchers in this community turned to variables outside economic and financial realm. For the past two decades, behavioral finance has been contributing by incorporating emotional aspects and psychology of investors in determining their behavior on stock market.

Suciu (2015) proves that in real market scenario one could easily disregard many key assumptions of efficient market hypothesis and mathematical finance. This is because traditional finance persists on proving market hypothesis rational. But today's erratic markets are facing a new reality that with the dramatic increase in news instantly available, the market participants are easily carried away by trends. There was a time when investors used to pay dearly for stock pricing services. They even used to wait for receiving earning announcements by mail before taking a buy-hold-sell decision but the days have gone. Information is cheap and widely available. They may buy on the rumor of company takeover and sell when another announcement hits the newswire.

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Sometimes this approach could work like a charm. At others, it would bring disaster. But that's the way heuristic works. Rational decision making is simply not possible given the sheer volume and speed with which information bombards the market (Logue, 2006).

Behavioral finance stands in sharp contrast to technical and fundamental analysis too. It is imperfect people who determine market prices not highly perfected valuation models. Price is less a function of company's facts and more a function of how investors perceive and feel about those facts. Everyday decision making takes place on the basis of social, motivational and psychological factors and is very often not based on stringent economic logic.

A general reactive human behavior cannot be forecasted by the strict quantitative finance provision of a classical fundamental analysis nor can human tendencies be modeled in the form of a *Cup and Handle*, *Double Top and Bottom* or *Flag and Pennant* charts put forward by technical analysis.

Behavioral finance today is shaping service delivery platforms and models (Schlichting, 2008). This fact has been well embraced by some of the leading management firms and investment houses who are aggressively embracing key tenants of behavioral finance into their day-to-day operations. With billions and trillions of dollars in motion, with thirty years of research in unveiling human cognitive biases and with irrational exuberance bringing about crunches like *Dot com bubble* and *Global Financial Crisis 2008 to 2009*, behavioral finance is growing in importance.

Aim of the study

Here we make an attempt to analyze the novel tactic of converting professional news into manageable information flows for out-psyching the market and for driving sharper trading decisions.

Research questions

1. Do news articles foretell forthcoming aggregate stock returns?
2. To what extent are stock market returns linked to reporting done by financial media?
3. How far can models based on such quantified news content predict future movement on the bourse?

Study contribution

The study contribution to literature is manifold. First of all, it is the first research of its kind to be conducted in emerging market of Pakistan. By identifying effect of financial media on returns of Pakistan's biggest and world's third best performing stock exchange, we contribute to a burgeoning literature that examines media's power to influence actual outcomes on stock exchange. The study results forms the first systematic identification of financial media's consequences and capacity to shape trader's behavior. We lay foundation for future studies that are expected to delve deeper into the role played by qualitative news content in decision making. Secondly, majority of words were found to have considerable linkage with future returns. These words came mostly from economic and financial background for example, we found words like 'inflation', 'GST', 'tranche', 'negative', 'borrowing', 'corrupt', 'debts', 'declining', 'shortfall', 'deficits', 'poor' and 'floods' significantly associated with future excess returns on the bourse. Thirdly, words were found not only significant but Granger Causative of future stock market movements. Fourthly, word indices predicted future movement on stock market both in and out of sample. Fifthly, predictability of model maximized with a month lag indicating that impact of news articles became pronounced on stock market and got incorporated in returns after a month.

LITERATURE REVIEW

"The stock market is a device to transfer money from the impatient to the patient. Most people get interested in a stock when everyone else is. The time to get interested is when no one else is"--- Warren Buffet

Behavioral finance and economics took birth with Adam Smith coining the "Theory of Mortal Sentiments" in early 18th century. Subsequently, hundreds of studies have been published on the subject. This mini review is limited in scope to present a complete overview of the field; therefore, the interested reader is referred to Bikas et al. (2013) for a comprehensive review of intriguing discoveries and development trends in the field of behavioral finance.

The area has enjoyed huge burst of research work and has exploded with new discoveries in recent past. This phenomenon rocked the financial markets during global financial crisis. It is now an indubitable reality that psychology permeates the financial landscape. Many asset management and financial service firms now explicitly base their strategies on the core principles of behavioral finance. The examples range from Goldman Sachs, Merrill Lynch, Nuveen, Panagora, Vanguard, Fuller and Thaler Asset Management, Martingale Asset Management to European financial institutions J.P. Morgan, KBC, ABN Amro among many others.

Sentiment and emotional analysis of text for stock market prediction is a vibrant and ongoing topic with contradictory findings. Main approaches to sentiment detection have been reviewed by Tang et al. (2009).

There is a body of research concerned with processing

text and classifying its emotional stance as positive or negative for market prediction (Schumaker et al., 2012). However, their approach was not quite successful. A more successful example recently is that of Yu et al. (2013) who used a set of seed words expanded with the help of contextual entropy model to classify sentiment expressed by news articles resulting in improved classification performance. Using this approach, they were able to improve accuracy results from 52 to 91.5%.

Media speculation and performance of financial markets are interconnected. The literature is already overwhelming with numerous studies identifying interesting relationship between journalistic views and financial market performance. Successful attempts have been made to study the response of stock markets to the internet stock message boards (Antweiler and Frank, 2004; Das and Chen, 2007), twitter mood of investors (Bomfim, 2000), scheduled monetary policy announce-ments (Bollen et al., 2011), corporate governance press news (Carretta et al., 2011), announcements about money supply, inflation and real economic activities (Pearce and Roley, 1984), Wall Street Journal analysts' recommendations (Barber and Loeffler, 1993), abreast of the Market-WSJ Column (Tetlock, 2007), Dow Jones News Servic (Tetlock, 2011) and breaking financial news (Chen, 2006).

A recent piece of research by Kim and Jeong (2012) discovered that bad news disseminated faster in social media and aroused negative purchase sentiments among investors. Another interesting development is effort by (Wisniewski and Lambe, 2013), who showed that there is sentiment implicit in media reports to which investors react vehemently.

They indicated negative media attention Granger Caused banking sector stock returns during Global Financial crisis 2008 to 2009. Some researchers have gone over and beyond the stocks to study impact of economic news on prices of other securities such as bonds (Balduzzi et al., 1996), foreign currency (Chatrath et al., 2014) and mutual funds (Fang et al., 2014).

Others have taken a tangent approach and endeavored to predict industrial production (Kholodilin et al., 2014) as well as track business cycle (Iselin and Siliverstovs, 2013) using media data. The former study was conducted in Germany and the latter was performed for both Germany and Switzerland. Iselin and Siliverstovs (2012) constructed R-Word Index specifically for Switzerland and evaluated its predictive ability for gross domestic product (GDP) growth. They witnessed statistically significant improvement in forecasting ability that surpassed benchmark autoregressive model. The study belongs to the stream of literature exploiting news content for stock market prediction. We find following studies worth mentioning to build a robust comprehension of this research problem.

Barber and Odean (2012) posited that the individual investors are net buyers of attention grabbing stocks, those that appeared more frequently in news. Machine learning, that uses computational modeling and pattern recognition, was implemented by Chen (2006). They presented a system that by learning the importance of breaking news on performance of a stock, predicted stock price changes. Out of the different textual representations, like bag of words, noun phrases, named entities, they found proper noun scheme most pertinent and articulate with best performance results. Engle and Victor (1993) concluded that huge positive and unanticipated negative shocks were responsible for bringing about big fluctuations and exacerbating market volatility.

In the department of Systems Engineering and Engineering Management at Chinese University Hong Kong, Fung et al. (2002) developed a method to forecast price trends following publication of news. Using top software available on the market, IBM's Intelligent Miner for Text and SVMlight from Dortmund University for classification, this approach for identifying stock trends proved to be profitable. It is also possible to use linear regression directly.

Tetlock et al. (2008) estimated unknown parameters in linear regression using ordinary least square (OLS) and suggested that fraction of negative words found in news stories accurately predicted firms' future earnings and stock returns. Kaminsky and Schmukler (1999) discovered that during chaotic financial environment of 1997 to 98, market jitters were triggered primarily by herd instinct of investors who overreacted to certain news such as news about international agreements and credit ratings having substantial effect. In addition, they confirmed investors' overreaction to bad news. They proclaimed; however, that investors exhibited this overreaction particularly during good times (Veronesi, 1999).

In this regard, main reference is Ammann et al. (2014) who summarized articles published in *Handelsblatt*, a leading financial newspaper, by constructing word count indices and found them valuable predictors of future DAX (German Stock Exchange) returns, both in and out of sample. They extended the study with cluster analysis and showed that optimal level of fragmentation of news content, for best predictive values, was seven clusters.

In our native country, past research has focused mostly on event study methodology. On the one hand, there is Hanan et al. (2012) who determined the impact of natural catastrophes, terrorist attacks and political bedlams on KSE-100 index and found terrorist attacks most profoundly affected stock markets. On the other hand, we have Sohail and Yasmin (2014) who studied under or over reaction of KSE to the aftermath of Global Financial Crisis and found insignificant reaction from the bourse owing primarily to the weak linkages of country to the international securities market.

Since in the past, numeric data had been widely explored as an indicator of profitable stock market

opportunities in Pakistan, we, therefore, focused our research on textual indicators. News articles were quantified and scored by the construction of word count indices for individual words. We, hereby, demonstrate a sophisticated system for monitoring and predicting future stock market behaviors. We discriminate our study from existing forecasting techniques by relying on non-quantifiable data – news articles. Several text and data mining techniques were employed and correlation as well as t-test based stepwise multiple regression served as major techniques for offering us a glimpse into stock market-press linkages.

Finally, out of the sample analysis using very simple, rolling window regression was carried out and results indicated that our approach was successful in predicting future stock returns.

METHODOLOGY

In this study, we construct word count indices in an attempt to explore the relation between structured news content and lagged Karachi Stock Exchange returns. Word indices, for the purpose of this study take on a specific meaning. It refers to an index of a particular word established over previous 24 weeks.

Word index is a crude measure as it is mix of information, emotion, noise, and error of estimation. Nonetheless, it proved useful in predicting forthcoming stock market returns in some previous studies (Ammann et al., 2014; Barber and Loeffler, 1993; Fang et al., 2014; Tetlock et al., 2008).

The Economist (The Economist, 1998) first coined the term "recession index" during the major financial crunch of 1990s, the R-index mirrored troughs of business cycle pretty closely. MarketPsych (2010) indices analyze real time news and have created Gloom, Fear and Joy indicators. Because psychological states exert influence on trading behavior of market participants, creating indices of violence, conflict, urgency etc. can prove vital to determine timing to market intervention by investors as well as allocation or sector rotation decisions.

We experiment with a defined set of keywords that are more likely to trigger investors' sentiments and urge them to change position on bourse. We analyzed 16 years of news articles in a business and financial magazine, *Pak and Gulf Economist*, and created an index of words at weekly basis. *Pak and Gulf Economist* is an influential magazine having reach to a wide audience across all ages and walks of life.

So, we aimed at assessing the impact the weekly magazine had on KSE, ranked 3rd best performing stock market in the world. We did not restrict ourselves to front page banner headlines like previous studies (Casarin and Squazzoni, 2012) rather, we comprehensively covered periods of market volatility like Dot Com bubble and Sub-prime crisis 2008 to 2009.

Albeit, we could not unearth any temporal significance primarily because of Pakistan's limited international financial linkages that averted contagion repercussions of Dot Com bubble and domino effect of Sub-prime crisis. We first tested the extent to which word indices tend to correlate with KSE returns and then looked for any possible causal relation between the two. We came to an intriguing finding. Numerous word indices were not only correlated to KSE returns but also *Granger Caused* future returns.

In addition, word indices continued to have explanatory power over and above several benchmark economic predictors. This is because word indices are source of supplementary information which remains unexploited by conventional macroeconomic predictors.

Data

Data set used in this study comprises of magazine news articles, Karachi Stock Exchange data, risk-free interest rate and data on control variables.

Our chief data set comprises 16 years of financial and business articles published in "*Pak and Gulf Economist*", a weekly magazine, which covers the business and economic issues of Pakistan. Since established in 1977, it has been the leading weekly financial magazine having wide readership nationally and internationally. The magazine is also subscribed by some major libraries across the world.

For gaining intuition on importance of language in stock returns, we scored and quantified qualitative news data by constructing indices for 511 individual words (Table 1). Instant availability, ease of construction, and potential zero correlation with macro-economic indicators makes word count indices handy and worthwhile financial indicators. Intense research in this realm documents word indices as reliable and valid construct. We subject this view to empirical scrutiny in our return predictability tests. We now begin to examine whether words provide some novel information not already incorporated in stock market prices. The higher the frequency of a word over the past couples of weeks, the higher the value of word index.

We construct these indices using a standardized approach according to the study of Tetlock et al. (2008). We test the hypothesis that words act as stimuli for market response and vice versa. This is the same view held by The Economist (The Economist, 1998) that if the number of news articles reporting dreaded R-word has increased then perhaps another recession is looming around the corner. To keep things simple, we do not however measure the degree of sentiment or emotion expressed by a particular sentence.

Several standard control variables have been included to assess whether words can predict returns above and beyond previously acknowledged sources of predictability. Data on interest-free rate, Quantum Index of Large Scale Manufacturing (QILSM), Broad Money (M2), Balance of Trade (BOT), Consumer Price Index (CPI), and Term Spread (difference between 10 year and 1 year government bond yield) was retrieved from the website of State Bank of Pakistan. The index points for KSE-100 were taken from KSE website.

Study design

We conduct univariate and multivariate analysis on the study data set.

Univariate correlation analysis

Out of a variety of methods available to analyze financial news articles, we choose to construct word count indices. In order to create quantitative variable from unstructured text of news store, we had to devise a meaningful representation.

So, we collapsed the document containing news stories into two columns, one representing word count and the other word indices. Word indices were constructed on the basis of frequency with which that particular word appeared over prior 24 calendar weeks. We standardized each word by subtracting past 24 weeks' mean and dividing by past 24 weeks' standard deviation. The word indices are a stationary measure of media content that is later employed in regression analysis.

Since Pak and Gulf Economist is a weekly magazine, we use weekly news stories and stock returns because this is the highest frequency for which both data are readily available. One drawback of this choice is that news and stock returns frequency do not match with each other.

Table 1. List of individual words (N=511).

Account	Consumer	Epb	Insurance	Poverty	Strategic
Accountants	Consumption	Eps	Interest	Power	Strong
Acquire	Contract	Equity	Interesting	Premium	Stronger
Acquisition	Convinced	Erp	International	Prepared	Subsidies
Acquisitions	Corrupt	Error	Invested	President	Success
Admission	Corruption	Evasion	Investment	Pressure	Successfully
Advanced	Cost	Exchange	Investors	Pressures	Sui
Advertising	Costs	Excise	Ipps	Price	Sukuk
Affairs	Cotton	Expand	Islam	Prices	Supply
Affected	Country	Expanded	Islamic	Prime	Surged
Agency	Cpi	Expansion	Iso	Private	Surplus
Aggressive	Credit	Expectation	Jurisdiction	Privatization	Surprise
Agreement	Cricket	Expectations	Justice	Probability	Survive
Agricultural	Crises	Expenditure	Karachi	Production	Sustainable
Agriculture	Crisis	Expenses	Kesc	Productivity	Sustained
Airline	Critics	Export	Kibor	Profit	Takaful
Airlines	Crop	Exporters	Knowledge	Profitability	Taliban
Airport	Crops	Exports	Kse	Profits	Talks
Alleviation	Crucial	Failed	Lack	Progress	Tariff
Area	Crude	Failure	Leader	Projects	Tariffs
Army	Crunch	Fall	Lease	Proposed	Tax
Asset	Csr	Falling	Leasing	Prosperity	Taxation
Assets	Curb	Falls	Leverage	Protection	Taxes
Attack	Currency	Fdi	Levy	Ptcl	Technology
Attempt	Customer	Fear	Liability	Punjab	Terror
Authorities	Customers	Feared	Liberalization	Qatar	Terrorist
Automobile	Customs	Fears	Licenses	Quality	Textile
Bad	Dam	Finance	Life	Quota	Tfcs
Badly	Damage	Financial	Liquidity	Raise	Theft
Baluchistan	Dams	Financing	Listed	Raised	Thermal
Banking	Deadline	Fiscal	Literacy	Rate	Threat
Bankrupt	Death	Flood	Lng	Rates	Tight
Bankruptcy	Debt	Floods	Loan	Real	Tightening
Banks	Debts	Fluctuations	Loans	Recession	Tobacco
Benazir	Decision	Food	Losers	Record	Toll
Bilateral	Decline	Forces	Losses	Recovery	Trade
Bill	Declined	Foreign	Lpg	Reducing	Trading
Billion	Declining	Frustration	Lucky	Reduction	Training
Board	Decrease	Fund	Management	Refinery	Tranche
Bond	Decreased	Funds	Margin	Reform	Transparency
Bonds	Defaulters	Future	Meltdown	Regulation	Treasury
Bonus	Deficiency	Gainers	Merger	Regulators	Troops
Boom	Deficit	Gains	Mergers	Rehabilitation	Trough
Boost	Deficits	Gas	Metal	Reliable	Tsunami
Borrowers	Demand	Gaza	Microfinance	Relief	Turmoil
Borrowing	Democracy	Gdp	Military	Research	Turnover
Borrowings	Democratic	Gidc	Minus	Reserves	Ukraine
Brands	Deposits	Globalization	Mobile	Resources	Uncertainty
Budget	Depreciation	Gold	Modarba	Responsible	Unclear
Bullet	Depression	Goods	Modi	Restrictions	Understanding
Burden	Devaluation	Governance	Monetary	Revenue	Unemployment
Bureau	Devastating	Government	Monopoly	Revenues	Unload

Table 1. Cont'd.

Bureaucracy	Developed	Growing	Musharraf	Revival	Venture
Business	Development	Growth	Mutual	Rises	Verge
Capacity	Developments	Gsp	Nasdaq	Rising	Volatility
Capital	Deviation	Gst	Nawaz	Risk	Wanted
Capitalization	Difficult	Guarantee	Negative	Risks	War
Cargo	Disappointment	Gwadar	Negotiations	Rose	Warned
Cartel	Disappointments	Health	New	Saarc	Warning
Cellular	Disaster	Help	Nuclear	Saddam	Water
Cement	Dispute	High	Obama	Safe	Wave
Central	Diversification	Higher	Objectives	Sanctions	Weak
Challenge	Dividend	Highs	Ogdc	Saving	Weakness
Chance	Dividends	Hubco	Ogdcl	Savings	Weapons
Change	Doubt	Hydropower	Oil	Search	Win
Charged	Downswing	Imf	Open	Sector	Women
Charges	Downturn	Impact	Opportunity	Secure	Worries
Chemicals	Downward	Import	Optimism	Security	Worse
China	Drop	Imported	Optimistic	Sentiment	Worst
Claim	Dumping	Imports	Payout	Serious	Worth
Claimed	Duties	Imposition	Peace	Shaky	Wrong
Claims	Earnings	Impressive	Peaceful	Shariah	Wto
Clear	Earthquake	Improve	Peak	Shipping	Young
Climax	Ease	Improvement	Pessimism	Shortage	Zardari
Cng	Easing	Imran	Pessimistic	Shortages	-
Coal	Economic	Incentives	Petrol	Shortfall	-
Coalition	Economics	Income	Petroleum	Sindh	-
Collapse	Economy	Increase	Pia	Slump	-
Collapsed	Education	Increased	Picic	Sme	-
Commercial	Efficiency	Increasing	Policy	Smes	-
Commission	Efficient	India	Political	Smuggling	-
Company	Election	Industrial	Pollution	Soaring	-
Competition	Electricity	Industry	Poor	Software	-
Concentrated	Emergency	Inflation	Population	Solar	-
Conflict	Employment	Inflationary	Port	Stake	-
Consensus	Empowerment	Inflows	Positive	State	-
Construction	Energy	Infrastructure	Potential	Stock	-

Table shows 511 words tested in this study. Words have been reported in alphabetical order without any consideration of statistical significance. Pakistan's leading financial and economic magazine *Pak and Gulf Economist* has been used in this study. Occurrence of these words has been found for 16 years from 1999 to 2014 in all weekly issues of *Pak and Gulf Economist*.

We browsed the article through the online archive of "*Pak and Gulf Economist*" and passed the data through qualitative data analysis software to obtain individual word occurrences. Number of hits or occurrences of words were standardized to form z-score word count index as shown as follows:

$$Z_{n,t} = (c_{n,t} - \mu_c) / \sigma_c \qquad (1)$$

Where n=1,.....W words. 't' is time step while $\Delta t = 1$ week. The value of 't' ranges from week 1 (1st weekly issue of the magazine) up till week T (last weekly issue of the magazine). $c_{n,t}$ represents count of word 'n' at time 't'. $z_{n,t}$ is the standardized word count index of word 'n' at time step 't'. μ_c denotes the mean and σ_c symbolizes

standard deviation of that particular word over past 24 weekly issues of the magazine. In addition, we carried out Granger Causality test (Granger, 1969) to check whether word indices hold a probabilistic account of causality for future movements on bourse. We also classified the words according to Harvard Psychosocial Dictionary IV.

In-sample analysis

After univariate correlations, we performed multivariate stepwise regression to gain further insight into the existence and development of "news articles-stock market relationship".

The model we use here for predicting asset returns is the one

selected out of broad range of econometric tools for predicting future financial asset returns. Our model has inherited most of its features from the study of Ammann et al. (2014). Because of the highly multivariate nature of the data, we employ stepwise regression which is an automated tool, having the ease of acting as a single model. It has been widely deployed in exploratory stages to build the best model with right predictors.

Stepwise regression fits regression models by choosing predictor variables in an automated procedure. Each variable to be added to or subtracted from the set of explanatory variables is chosen based on pre-specified criteria. Though other techniques are possible, but in our algorithm, this decision to add or subtract a variable takes place via a sequence of F-tests. We employ two main approaches to stepwise regression here:

Forward selection: Starting with zero variables in the model, the addition of each variable in the model is tested against a pre-specified criterion which is the p-value of F-statistic. We use p-value threshold of 5% for entrance. The variable whose inclusion yields the highest statistical improvement of fit is added to the model. This process is repeated until no statistically significant improvement to the model can be made.

Backward elimination: The model, again considering all candidate variables, tests each variable against pre-set criterion and excludes the variables whose loss results in most insignificant model fit deterioration.

Criterion is again the p-value of F statistic fixed at 10% threshold for exit. This process is repeated iteratively until no variable can be excluded without a significant loss of model deterioration. When employed properly, stepwise regression results in more powerful information than does OLS. Poking variables in and out, this algorithm is especially useful for fine tuning a model containing highly multivariate dataset.

The equation for stepwise regression algorithm stated earlier can be put together as follows:

$$kse_{rt+1} = \alpha + \sum_{n=1}^{n} \beta_n z_{n,t} + \gamma c_v + \varepsilon_o \qquad (2)$$

Where kse_{rt+1} denote excess return on Karachi Stock Exchange as measured at time $t+1$. These excess returns are a function of word-indices ($z_{n,t}$) and control variables (c_v). Here, $z_{n,t}$ means the index of word 'n' at time period 't'. α is the intercept; β exposes excess return to n word indices while γ is a vector which represents factor loading for control variables. c_v a vector representing seven control variables: r_t, CPI, TS, volati, M2, BOT, QILSM. Each of these variables has been explained below. ε_o refers to disturbance term.

We mostly rely on control variables evidenced to have forecasting power in previous work (Schrimpf et al., 2007; Walkshaeusel and Lobe, 2011; Ammann et al. 2014). As one would expect, these control variables have been ascertained to exhibit a forecasting effect. In case a control variable is a return itself, we take excess return over KSE to avoid multicollinearity.

Term spread (TS) added here controls for interest rate fluctuations in economy (Domian and Reichenstein, 1998). r_t, which stands for lagged KSE excess return, has been taken into consideration here to take autocorrelation into account. Control variable **volati,** in accordance with Tetlock et al. (2008), has been introduced as a proxy for past volatility in Karachi Stock Market. **Volati** is meant to wane the confounding effect of past market volatility. It was computed by demeaning KSE log returns, squaring the residuals and then subtracting rolling average over past 36

weekly issues of the magazine. CPI, another control variable, has been entered to limit seasonal variation in data. CPI trend component was computed as rolling average of past 12 weeks of log CPI (Ammann et al., 2014).

Co-integration of broad macro-economic factors and stock market movements is well-documented in literature. Brighter prospects of large scale industrial production in country are sure to lead to a bullish market (Levine and Zervos, 1996). QILSM (Quantum Index of Large Scale Manufacturing) controls for this fact and is computed on the basis of latest production data of 112 items. To control for other macro-economic influences, we add Broad Money Supply (M2) (Friedman, 1988) and Balance of Trade (Chen, 2009).

Out of sample analysis

We segregated the time series data into in-sample and out-of-sample portions. In sample tests the model's goodness of fit whereas an out of sample analysis, also known as back testing, assesses the actual forecasting ability of the model. The significance of out of sample analysis cannot be overemphasized. It results in empirical evidence far more reliable than that based on in-sample analysis which is prone to data mining and outliers.

According to Giacomini and White (2006), while in-sample analysis might yield a good model fit and a high co-efficient of determination, it could partly be due to over-fitting. To gauge actual predicting capability of word count indices, we, thereby, resort to out of sample analysis. This test has gained reputation as an "Ultimate test of a forecasting model" Stock and Watson (2007) because it is better able to represent information available to forecaster in real time Diebold and Rudebusch (1991). Our first sample split takes place at the beginning of the evaluation period. To check our model's ability to effectively perform while its variables are altered, we back test our statistical model on historical data. We compute the KSE Excess Return estimates over rolling windows of fixed size through sample Zivot and Wang (2006). Rolling estimation windows ensure that we obtain maximum number of forecasts.

As the power of out of sample forecast evaluation test is strongest with lengthy sample periods (Hansen and Timmermann, 2012), we, therefore, set the rolling estimation window size to span 200 weekly issues of the magazine. We check predicting performance with the help of Equation 3 given as follows:

$$kse_{t-q+2,\, t+1} = \alpha + \sum_{i=1}^{i} \beta_i z_{t-q+1,\, t}^{i} + \gamma c_{v\, t-q+1,t} \qquad (3)$$

The usual procedure for this technique calls for splitting the historical data into estimation and prediction samples. We fit the model using estimation sample and make T-q step ahead predictions of KSE excess returns for the prediction sample.

We, then, roll estimation sample ahead at a preset increment of 1 week and repeat the estimation and prediction exercise until we are not able to make any more step-ahead predictions. In Equation 3, dependent variable is regressed on standardized word count indices using standard rolling window size of 200 weeks, q=200. T-q estimates of regression coefficients are obtained as a result of this stepwise regression. We denote these coefficients as α_{roll}, $\beta_{i,\, roll}$ and γ_{roll}. Where roll is rolling window index and roll = 1,…,T-q. The regression coefficients thus obtained are then substituted in Equation 4 to calculate fitted one step ahead KSE Excess Returns.

Table 2. Correlations of word indices with biweekly excess returns.

Word	Univariate correlation (1999-2014)	2-tailed significance value
Crisis	0.090*	0.015
Deficiency	0.090*	0.014
Easing	-0.076*	0.04
Nuclear	0.092*	0.012
Peaceful	0.089*	0.015
Pressure	-0.074*	0.044
Rate	-0.080*	0.031
Real	-0.074*	0.044
Regulation	0.073*	0.049
Saving	-0.121**	0.001
Trading	-0.076*	0.04

Table shows the coefficients of correlation between word indices and biweekly excess returns R ($z_{n,t}$, kse$_{rt+1}$) for the period 1999 to 2014. **Correlation is significant at the 99%. * Correlation is significant at the 95%.

$$\hat{kse}_{t+1} = \alpha_{roll} + \sum_{i=1}^{i} \beta_{i,roll} z_{i,t} + \gamma_{roll} c_{v\,t}$$

(4)

Where t=q,…., Total Observations-1 and roll=1,…,T-q. Equation 4 yields as many data points for predicted KSE Excess Returns as there are rolling windows. These predicted returns are regressed against actual; we then observe how closely these predicted returns track actual ones. We evaluate the accuracy of forecasted values, Ksê$_{t+1}$, by plotting them against realized returns. We find best fit regression line in accordance with equation (v) given below:

$$kse_t = g + h \cdot \hat{kse}_t$$

(5)

Intercept of regression equation is 'g' while 'h' represents the slope. If 'h' turns out to be significant, then we have sufficient evidence to claim that model is statistically robust to portend one step ahead KSE Excess Returns.

RESULTS AND DISCUSSION

Univariate correlations

We are able to replicate (Ammann et al., 2014) finding that one month ahead expected returns are predicted more accurately by employing news content and that news articles impact stock returns substantially. To correct for fluctuations in total volume of news articles spidered each week, we use standardized article word count instead of raw count. We make some noteworthy observations follows:

Numerous significant correlations were reported between word indices and KSE Excess Returns. Majority of the words had an algebraic sign of correlation coefficient that was in agreement with the words' connotation. For

instance, correlation co-efficient of 'peaceful' was positive while that of 'failed' and 'serious' were negative. We take lagged KSE Excess Returns and allow two lags one biweekly and second monthly. Results of this analysis for biweekly and monthly excess returns have been set out (Tables 2 to 5).

13 'word indices' and 64 'word counts' had statistically significant negative correlation with biweekly excess returns. We were able to pick out more than half of the word indices having negative correlation with monthly excess returns. We detected 96% word counts having negative correlation with biweekly excess returns and 93% having negative correlation with monthly excess returns.

On the whole, 75% words appeared to be negatively correlated. Highest reported correlation co-efficient with biweekly excess returns was that of word 'saving' at -0.121 while with monthly excess returns maximum correlation co-efficient was that of word 'deficiency' at -0.124. Almost 70% words having statistically significant association were nouns. 'inflation', 'GST', 'tranche', 'negative', 'borrowing', 'corrupt', 'debts', 'declining', 'shortfall', 'deficits', 'poor' and 'floods' were some of the negatively correlated words. No doubt, the words reported here, expressed going concerns over financial issues engulfing economy of Pakistan.

In addition, macro-economic issues like burgeoning 'inflation', escalating 'IMF' debt burden, alarming rates of 'corruption' and recent 'floods' were also spotted. It's clear that investors are substantially influenced by the tone of news. Buy, sell or hold decision making is done on the basis of news heard or read.

In consistence with research objective set at the beginning of the study, we found substantial evidence that a relation exists between media reporting and subsequent stock returns. Initially, we had set out to discover relation between press coverage and stock

Table 3. Correlations of word counts with biweekly excess returns.

Word	Univariate correlation (1999-2014)	2-tailed significance value
Poor	-0.162**	0.000
Deficit	-0.230**	0.000
Difficult	-0.234**	0.000
Responsible	-0.121**	0.001
Failed	-0.176**	0.000
Serious	-0.178**	0.000
Risk	-0.230**	0.000
Consumption	-0.119**	0.001
Inflation	-0.294**	0.000
Gst	-0.120**	0.001
Tranche	-0.114**	0.002
Negative	-0.263**	0.000
Borrowing	-0.098**	0.008
Corrupt	-0.075*	0.043
Debts	-0.097**	0.009
Declining	-0.128**	0.001
Expenses	-0.119**	0.001
Developments	-0.183**	0.000
Expand	-0.190**	0.000
Bilateral	-0.091*	0.014
Downward	-0.112**	0.002
Payout	-0.098**	0.008
Shortfall	-0.198**	0.000
Cartel	0.075*	0.042
Worst	-0.229**	0.000
Challenge	-0.188**	0.000
Chance	-0.201**	0.000
Change	-0.220**	0.000
Claim	-0.087*	0.019
Cng	-0.118**	0.001
Islamic	-0.102**	0.006
Floods	-0.125**	0.001
Weak	-0.209**	0.000
Crunch	-0.224**	0.000
Expanded	-0.126**	0.001
Inflationary	-0.303**	0.000
Literacy	-0.125**	0.001
Lucky	-0.160**	0.000
Pressures	-0.328**	0.000
Ogdc	-0.156**	0.000
Prosperity	-0.109**	0.003
Sentiment	-0.185**	0.000
Slump	-0.097**	0.008
Terror	-0.084*	0.022
Sukuk	-0.096**	0.009
Volatility	-0.151**	0.000
Uncertainty	-0.230**	0.000
Turmoil	-0.195**	0.000
Dumping	0.124**	0.001
Collapse	-0.080*	0.031
Weakness	-0.160**	0.000

Table shows the coefficients of correlation between word counts and biweekly excess returns $R(z_{n,t}, \text{kse}_{rt+1})$ for the period 1999 to 2014. All coefficients are statistically significant at 2.5% indicated by * and 0.5% indicated by **.

Table 4. Correlations of word indices with monthly excess returns.

Word	Univariate correlation (1999-2014)	2-tailed significance value
Business	-0.079*	0.033
China	-0.083*	0.024
Defaulters	0.108**	0.004
Deficiency	0.124**	0.001
Downturn	-0.081*	0.029
Imf	-0.100**	0.007
Interesting	-0.083*	0.025
Literacy	-0.086*	0.021
Mortgage	0.088*	0.017
Peaceful	0.083*	0.024
President	-0.089*	0.016

Table shows the coefficients of correlation between word indices and monthly excess returns R ($z_{n,t}$, kse $_{rt+1}$) for the period 1999 to 2014; ** means correlation is significant at the 99%. *Correlation is significant at the 95%.

Table 5. Correlations of word counts with monthly excess returns.

Word	Univariate correlation (1999-2014)	2-tailed significance value
Declined	-0.111**	0.003
Difficult	-0.202**	0.000
Failed	-0.148**	0.000
Serious	-0.156**	0.000
Risk	-0.171**	0.000
Wto	0.148**	0.000
Monetary	-0.200**	0.000
Borrowing	-0.103**	0.005
Falling	-0.124**	0.001
Literacy	-0.121**	0.001
Prosperity	-0.109**	0.003
Reliable	-0.116**	0.002
Peak	-0.167**	0.000
Pressures	-0.289**	0.000
Zardari	-0.263**	0.000

Table shows the coefficients of correlation between word counts and monthly excess returns R ($z_{n,t}$, kse $_{rt+1}$) for the period 1999-2014. All coefficients are statistically significant at 2.5% indicated by * and 0.5% indicated by **.

market returns. Strong evidence has been found which supports the belief that language content has an inherent explanatory power which if accounted for can neatly elaborate on stock market developments.

Correlation coefficients ranged between -1.121 to 1.124 inclusive. Indices of words 'IMF' and 'president' had negative correlation coefficients. These results appear genuine given the likely impact of political upheavals on stock market (Figure 2 and 3).

In our opinion, there are several reasons for low correlation coefficients. First, words counts are considered noisy and crude measures to approach a text and cannot dominate traditional fundamental measures. Second, viewership and audience of *Pak and Gulf Economist* is limited. Third, *Pak and Gulf Economist* had low performance basically because it did not have plenty of data. News articles data set should have been much larger for more accurate results.

We also note that daily news has recency effect which does not last longer whereas knowledge, sentiment and information conveyed by magazine articles are expected to last longer. This underscores very important difference between magazines and daily newspapers.

Results have been analyzed more closely by

Table 6. Significant correlations from correlation matrix.

Words	Correlation	Words
Decline	0.209**	Earnings
Decline	0.184**	Pressure
Gdp	0.145**	Decline
Ipps	0.372**	KESC
Earnings	0.119**	Risk
Customs	0.242**	Incentives
Record	0.107**	Expansion
Customs	0.133**	Taxation
Excise	0.284**	Customs
Developed	0.129**	Export
Population	0.134**	Consumption
Profits	0.110**	Crunch
Software	0.167**	Boom
Borrowing	0.112**	Charges
Profits	0.113**	Economy
Electricity	0.287**	Dam
Gdp	0.445**	Economy
Gdp	0.123**	Trade
Electricity	0.378**	City
Stock	0.422**	Equity
Inflation	0.298**	CPI
Inflation	0.443**	Prices
Crises	0.118**	Difficult
Deficits	0.284**	Expenditure
Cpi	0.298**	Inflation
Curb	0.208**	Inflation
Borrowing	0.178**	Inflation
Acquisitions	0.668**	Mergers
Rehabilitation	0.162**	Floods
Financing	0.155**	Risks
Governance	0.279**	Transparency
Economy	0.208**	Uncertainty
Economy	0.151**	FDI
Textile	0.530**	Export
Islamic	0.365**	Financing
Port	0.559**	Cargo
Economic	0.243**	Poverty
Energy	0.425**	Supply
Credit	0.494**	Banking

Due to space constraint, it is not possible to report correlation matrix here. However, in this table, we do highlight some important results. We infer that since words do speak a lot about actual situation, it is possible to leverage their ability to form an overall opinion about forthcoming market returns. **Correlation is significant at the 99%. *Correlation is significant at the 95%. "Borrowing" is associated with "inflation", "financing" brings about "risk", "rehabilitation" follows "floods", "CPI" is an indicator of "Inflation", "Textile" is one of the biggest "Export" of Pakistan, hence the two co-occur 31% of time. Well known and most commonly associated macro-economic variables "GDP" and "trade" and "GDP" and "economy" were also reported to have positive correlation coefficient significant at 99% confidence level.

constructing a correlation matrix. We checked the significance at 99 and 95% confidence level using two-tailed test. Out of numerous statistically significant correlations observed, we report only a few here for precision and brevity. A remarkable discovery is that correlation matrix mirrored and imitated some well-established economic relationships like those between "GDP" and "Trade", "CPI" and "Inflation", "Financing" and "Risk" and "Acquisitions" and "Mergers". In general, results suggested strong positive association between many economically associated terms (Table 6).

All in all, the results suggest that words are a potentially useful media indicator that must be employed in forecast combination for accurate predictability. We also notice that correlation coefficients become stronger and stronger with the increasing news frequencies as it leads to higher word counts.

After correlation analysis, Bi-variate Granger Causality Test was conducted to find possible causal relations between words and excess returns. Univariate causality was reported in 31.3% cases or in nearly 1/3 of the instances. Causality occurrences increased once a greater lag was allowed for words to have their impact pronounced on bourse.

This finding is consistent with Multiple Linear Regression results. Feedback was reported in only 2.9% instances eliminating the possibility of endogeneity. We employed Granger Causality test at 5% significance level allowing a maximum of eight lags. Overall, the predictability trend of words towards the bourse was manifested. Here, we do not take causality to imply that influence between variables is direct. Rather, we interpret it to mean that stock market prices capture the impact of news stories and new information provided by media.

Besides, the up and down of KSE returns induced occurrence of certain words, mostly negative ones, in news articles. Mass media has the ability to affect prices and returns even after supplying us with in-genuine news. An important factor determining security prices is breadth of information dissemination owing to the fact that news has certainly far broader reach than corporate or stock market analysis reports. This finding is particularly consistent with Fang et al. (2014).

In-sample analysis

Results of multivariate stepwise regression taking control variables and word indices as independent variables and biweekly and monthly KSE-100 Excess Returns as dependent variables was documented here. In earnings predictability regressions, we identify seven control variables that could impact our returns substantially.

Before carrying out in-sample stepwise multiple regression analysis, data was tested for all assumptions of Multiple Linear Regression. We prevented autocorrelation by taking lagged KSE excess returns.

Absence of multi-collinearity was ensured by checking

correlations between control variables which were found to be insignificant. The final model we reached in stepwise fashion, by taking biweekly excess returns as dependent variable, had 39 variables. Even though, we introduced benchmark macro-economic indicators; nevertheless, individual words continued to possess great explanatory power. This finding is in line with Tetlock et al. (2008).

To a large extent, the study findings are consistent with the study of Ammann et al. (2014) for both univariate and multivariate analysis. What is more, a somewhat different set of words appeared to have explanatory power in the presence of control variables.

The multivariate stepwise regression resulted in many words with considerable explanatory power; though, nouns emerged most frequently as compared to other word classes. The adjusted R^2, for multivariate in-sample analysis, reported here (69%) is substantially larger than 15% documented by (Ammann et al., 2014).

Stepwise regression was run with a rolling window size of 200 weeks. That means for every window regression was run, once. No word was persistently chosen through entire period, though, "shortfall" and "payout" appeared more often (Tables 7 and 8).

We noticed some words attaining signs opposite of their connotation for example, the word "literacy" had negative factor loading. It can be explained in the light of the context the word appeared. In Pakistan, literacy is critically low which is hampering the economic progress of the country. Press keeps on highlighting this issue from time to time. In this case "literacy" is not acting as an economic stimulator.

We observe that economic crisis in country stimulated news reporting which strengthened explanatory power of news articles. Words found significant in multivariate setting were almost entirely different from those found in Univariate analysis. In additional unreported tests, we run regressions separately for sub-periods but the pattern in these correlations is not fairly analogous to that for all periods. These temporal regressions did not appear to have prominent effect for future returns.

The evidence makes it clear that even a crude measure of language could robustly predict returns even beyond these popular indictors of stock market peaks and valleys. This is primarily because language content has incremental explanatory power for future earnings. Quantitative variables do not accurately represent expectation of investors whereas; a rudimentary linguistic measure of news can contribute significantly to a useful measure of returns.

In this study, we developed and applied a novel empirical approach for return forecasts. The study findings clearly show that when press coverage goes negative KSE falls and vice versa. Columnists and writers act as disseminator of information. Their beliefs get converged when all traders get to see same piece of information. If noise traders are going to have an impact on market security prices, there must be a common element in their belief formation. Our study concentrates on one such common component (Tetlock, 2010). After this analysis we are now in a position to make definite conclusions about impact of print media on future stock returns.

Out-of-sample analysis

As far as model's goodness-of-fit is concerned, we report higher goodness-of-fit measure as compared to some previous studies (Ammann et al., 2014; Campbell and Thompson, 2008).

Figure 1 plots forecasted returns against actual KSE excess returns given a month's lag. It provides striking evidence that forecasted returns concentrate fairly closely around actual KSE excess returns over the entire sample period suggesting that press stories could play a vital role in disseminating and communicating information about stock market returns. Further support for this interpretation is provided by t-statistic of B-coefficient, in Equation 5 which is statistically significant.

We report Adjusted R^2 of 19.3%. Many previous studies reported single digit R^2 values. The study closely resembling ours (Ammann et al., 2014) documented an Adjusted R^2 of 1.27%. It must be noted, though, that our study rolling window size is 200 compared to 60 used in aforementioned study. Our study findings largely consistent with those of Ammann et al. (2014) suggest that out of sample analysis fares better with large rolling window sizes as compared to small ones.

We see however, that forecasted returns have become more volatile during latter half of the study period. Predictability varied over financial time series but we find lower predictability during second half of analysis period when markets had become more volatile. We also tested with varying rolling window sizes and observed higher predicting accuracy with large window sizes. This phenomenon can be attributed to the fact that very small sample sizes are prone to the issues of over fitting and multicollinearity.

Forecasted monthly excess returns manifest predictive potential for actual monthly excess returns but we were unable to detect statistically accurate prediction of actual biweekly returns by forecasted biweekly returns (Table 9). It is our study interpretation that news gets incorporated into stock returns within a month. Some readers might perceive this statement as a possible rejection of efficient market hypothesis, but it is not so, as the efficient market hypothesis is concerned with current stock prices, not the future stock returns.

One of the possible explanations of why forecasting ability enhances when a month's lag is allowed is provided by Campbell (1991) and Cochrane (1992) who discovered that predictability increases with time horizon. Another explanation is outlined by Tetlock et al. (2008) who holds the opinion that investors never respond fully

Table 7. Beta coefficients**.**

Independent variable	Unstandardized beta	Standard error of beta	Standardized beta	t-values	P-values	Collinearity statistics	
						Tolerance	VIF
B_0	-0.074	0.005	-	-13.749	0	-	-
Lagged biweekly excess returns	0.396	0.041	0.397	9.595	0	0.743	1.345
Rises	-0.005	0.001	-0.144	-3.783	0	0.874	1.144
Advertising	0.003	0.001	0.112	3.028	0.003	0.922	1.084
Brands	-0.003	0.001	-0.141	-3.762	0	0.912	1.096
Mergers	0.003	0.001	0.119	3.046	0.003	0.83	1.205
Secure	0.005	0.001	0.164	4.154	0	0.819	1.222
Conflict	-0.007	0.001	-0.214	-5.436	0	0.821	1.218
Leverage	0.005	0.001	0.144	3.811	0	0.889	1.125
ISO	0.007	0.001	0.254	6.196	0	0.755	1.324
Term spread	1.175	0.157	0.303	7.488	0	0.777	1.288
Tightening	0.006	0.001	0.168	4.376	0	0.858	1.165
Training	0.003	0.001	0.107	2.707	0.007	0.809	1.237
Leasing	-0.002	0.001	-0.113	-2.974	0.003	0.879	1.138
Smuggling	-0.005	0.001	-0.193	-4.949	0	0.84	1.19
Protection	-0.003	0.001	-0.123	-3.193	0.002	0.857	1.167
Death	0.004	0.001	0.127	3.208	0.002	0.81	1.235
Venture	0.005	0.001	0.144	3.8	0	0.885	1.13
Port	-0.003	0.001	-0.12	-2.982	0.003	0.782	1.279
Volati biweekly	-2.632	0.719	-0.144	-3.662	0	0.824	1.214
Coalition	0.004	0.001	0.13	3.372	0.001	0.859	1.164
Literacy	-0.004	0.001	-0.149	-3.719	0	0.791	1.264
Shortfall	-0.003	0.001	-0.083	-2.165	0.031	0.861	1.161
Change	0.003	0.001	0.112	2.99	0.003	0.911	1.098
Turnover	0.003	0.001	0.095	2.408	0.017	0.822	1.217
Dubai	-0.002	0.001	-0.117	-3.101	0.002	0.898	1.114
Raised	0.003	0.001	0.098	2.579	0.011	0.876	1.142
Asset	-0.002	0.001	-0.083	-2.084	0.038	0.799	1.252
FDI	-0.003	0.001	-0.113	-2.993	0.003	0.896	1.116
OGDCL	-0.003	0.001	-0.11	-2.901	0.004	0.884	1.131
Credit	-0.003	0.001	-0.092	-2.391	0.018	0.853	1.172
Efficient	-0.003	0.001	-0.082	-2.097	0.037	0.842	1.188
Weakness	0.003	0.001	0.087	2.312	0.022	0.894	1.119
Payout	-0.003	0.001	-0.081	-2.088	0.038	0.851	1.175
R			85.4%				

Table 7. Contd.

R^2	72.9%
Durbin Watson	1.951
ANOVA F calculated	17.361

Table shows estimates of the ability of words to predict biweekly excess returns using ordinary least squares regression. Multiple linear regression in-sample analysis regressed biweekly excess returns on word-indices and control variables. The probability criterion for stepwise regression is 5% on entry and 10% on exit. Final model produced 33 regressors in step-wise manner; p-value for t-statistics reports that all of these words are significant at 95% confidence level. There is absence of multicollinearity in the data. The word 'conflict' attains maximum beta co-efficient. 'i' stands for an index of a word. ANOVA for final model shows statistically significant F value of 17.361 indicating model is good-fit. We can infer from these results that final model significantly enhances our ability to predict future biweekly excess returns. Model attained in step-wise regression held highest possible R^2 value of 72.9%. Autocorrelation Test Durbin Watson reports absence of autocorrelation in the data.

Table 8. Coefficients.

Independent variable	Unstandardized beta	Standard error of beta	Standardized beta	t-values	p-values	Variance inflation factor
B$_0$	-0.015	0.004	-	-4.163	0	-
Lagged monthly excess returns	0.832	0.036	0.832	23.032	0	1.036
Verge	0.007	0.002	0.138	3.788	0	1.06
Increase	-0.008	0.002	-0.165	-4.452	0	1.088
Crucial	0.005	0.002	0.103	2.772	0.006	1.094
Slump	0.006	0.002	0.121	3.358	0.001	1.035
Collapsed	0.004	0.002	0.092	2.529	0.012	1.047
Weakness	0.005	0.002	0.099	2.737	0.007	1.032
SME	0.003	0.001	0.098	2.707	0.007	1.036
Board	0.004	0.002	0.095	2.536	0.012	1.105
R^2			70.1%			
Adj. R^2			69%			
ANOVA F			61.841			

From the table, multiple linear regression in-sample analysis was performed by regressing "monthly excess returns" on word-indices and control variables. Final model produced 9 regressors in step-wise manner; p-value for t-statistics reports that all of these words are significant at 95% confidence level. Collinearity statistic "variance inflation factor" reveals absence of multicollinearity in the data. 'Verge', 'crucial', 'slump', 'collapsed', 'weakness', 'SME' and 'board' had a positive Beta co-efficient. 'Increase' had a negative Beta co-efficient. The word 'increase' attains maximum Beta co-efficient. Final model for monthly excess returns attained in step-wise regression had R^2 of 69%. ANOVA for final model shows statistically significant F value of 61.841 indicating model is good-fit. We can infer from these results that final model significantly enhances our ability to predict monthly excess returns.

to information embedded in news, immediately. In general, results allow us to draw the conclusion that investors' psychology is shaped by news content and information from all sources available. General findings of behavioral finance suggest that fundamental factors have lost their

Figure 1. Line graph of forecasted vs. Actual monthly excess returns (Actual excess returns of KSE-100 index were regressed on forecasted returns. The line graph shows both lines closely track each other though forecasted returns are more volatile than actual during latter half of the study period).

Table 9. Coefficients of actual versus forecasted excess returns (Monthly).

Final model obtained in stepwise fashion	Unstandardized beta	Standard error of beta	Standardized beta	t-values for model variables	p-values for t-statistics
B_0	-0.052	0.009	-	-5.865	0
Forecast	0.305	0.088	0.459	3.466	0.001
R			0.459		
R^2			21.1%		
Adj. R^2			19.3%		

Table shows the regression of actual monthly excess return on forecasted monthly KSE excess return. Beta co-efficient is 0.305, its t-value is 3.466 and p-value is less than 0.01. Correlation between forecasted and actual monthly excess return is moderately positive at 0.459. 21.1% variation in actual monthly excess return is accounted for by forecasted monthly excess returns.

predictability overtime as investors' sentiments are tied more to the unbiased sentiment expressed by news articles than traditional financial data. Having established that media induces market returns, we come to the conclusion that print media's impact on bourse could have been much stronger had the press not been cautious in delivering bad news.

Given the freedom allowed to press, one could easily object that press reporters have never been cautious and never deliberately could follow a less critical stance in reporting unpleasant news. But our conjecture is supported by firm evidence of press indeed having become cautious during times of crisis. We refer the reader to a recent study of US media coverage of financial crisis. In this report, Peter S. Goodman (Schiffrin, 2010), a renowned US economics author and journalist, submitted with evidence that U.S. journalists were wary in covering bad news in global crisis 2008 to

2009 because during market turmoil such influential streamers could have had dramatically swayed market sentiments.

Researchers have mixed claims about how publicly available news predicts subsequent market returns. Despite extensive work in this field, previous literature, in Pakistan, supplies few studies examining the ability of financial or business magazine to predict stock market returns. Such elaborate analysis, on the ability of a financial or business magazine to foretell stock returns, has not been carried out before. Particularly, our finding that financial and economic news articles are valuable predictors of future KSE returns in and out of sample have not been reported before. Our results though economically small, possess statistic robustness. We advise that similar analysis must be carried out by varying time lags and by incorporating myriad media sources so that we arrive at a model most apt and robust
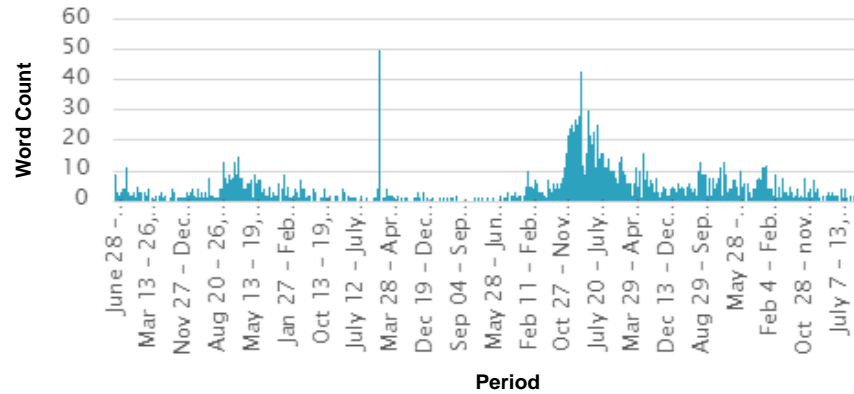
Figure 2. Recession word index predicted on-set of recession when word count was continuously high in the last quarter of 2007 (Similarly the R-word index rose in late 2001, giving early signals about the impending bust of dot-com bubble).
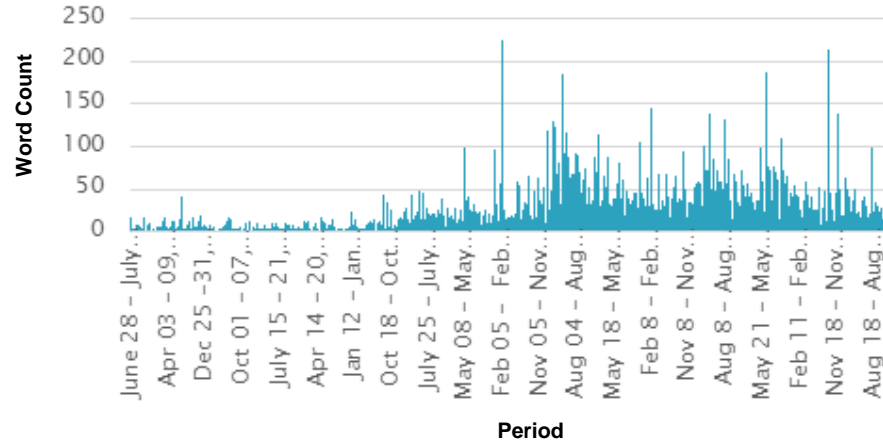

Figure 3. Inflation word index showing Pakistan has experienced an accelerating rate of inflation since 2005 and so the issue remains a subject of headlines.

Theoretical and managerial implications

The main goal of the study is to address almost complete lack of research evidence on empirical relation between financial press and stock market returns in Pakistan. The study results serve as a guide to investment and portfolio managers, corporate financial managers, personal finance planners, stock brokers, investment advisors among others. They may consider taking press news into account while making investment analysis to better gauge security risks. Quantifying qualitative news data in the manner presented here can help improve decision making, execution will get better and so will the results. Digital news on the wire is available instantly and can be incorporated in the models as shown in this study, to

predict forthcoming returns on stock market. Employing qualitative and quantitative techniques simultaneously lead to more precise estimates of fair value and future returns. Recession, inflation and poverty indices can prove to be immensely useful to policy makers and other administrative bodies (Figures 2 and 3).

Conclusion

Peter S. Goodman, Global Editor-in-Chief of Business Times reports that:

'…Investors and markets and ordinary people would move their money in reaction to what we and other major media were reporting and this would in turn affect the policy climate, the perception of need for emergency measures, the politics of the debate over those measures,

and the public mood, which then reverberated back on everything else' (Schiffrin, 2010)

The study systematically explores the predictive power of business news articles for KSE excess returns. We find monthly return predictability pattern following news articles. We construct a straight forward measure of news content that corresponds to the ongoing market situation. It should give a vivid picture of where the economy is heading to. Ebbs and flows of economy are mirrored by surge and decline in occurrence of positive or negative connotations. Whether economy is on path of recovery or another crisis is unfolding itself is evident from news content. The study measure, word count indices are potentially uncorrelated to benchmark macro-economic indicators. Therefore, they are highly valuable indicators of economic activity.

The hypothesis that word indices are correlated to future KSE excess returns receives support from data. Many of these words Granger caused future KSE Excess Returns. Second finding is that news content had an explanatory power for future KSE returns that went beyond other well-established predictors In and Out of sample. Thus word indices are reasonable proxies for stock exchange activity.

Most words which were found significant in correlation and in-sample regression pinpoint critical macro-economic issues. These words had a socio-economic background. This attests to the unquestionable prominence of seemingly random content of news articles. Investors start trading on news after it is published. News content has a linkage with investor's psychological makeup. The study research also points out that at least a month is required for words to have their impact pronounced on bourse.

Delimitations of the study

Major limitation of this study relates to sample design. The study data comes solely from *Pak and Gulf Economist*, the viewership of which varies among different stakeholders. So, we restrain ourselves from claiming that these findings are widely applicable. That leaves a lot of room for further exploration of financial media and stock market relationship in an emerging economy like that of Pakistan's.

Future developments

Preliminary results are highly encouraging. We aim to carry out a research in future to assess purely causal impact of media on stock market returns after controlling for all simultaneous determinants of trader's demand. Furthermore, we have laid the ground for future studies to examine myriads of sources of investor information like

utilizing news coming from all print and electronic media and assessing its impact on various financial markets such as mercantile exchange, bond market, stock market, real estate market, simultaneously.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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Full Length Research Paper

Strategies for achieving sustainable economy in Nigeria taking into consideration the acceptable stakeholders

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The downward trend in the Nigerian economy has become a source of worry to both the leaders and the led, making it difficult for the managers of businesses to make the decision for sustainable businesses. This work looks at the explosion of the Nigerian population from the year 2005 to date, the modern state of the Nigerian economy and the failed strategies tried in the past, with a look at the acceptable stakeholders, sustainable economy, and the strategic priorities to be considered in the Nigerian context. Theories of modernization (showing the five take off stages), sustainable development, and human development (with the five key capitals) were used to analyze the problem of achieving a sustainable economy in Nigeria. The triple-bottom-line strategy was seen to be a possible solution to the impending problem of unstable economy in Nigeria, intending to social responsibility, environmental protection, and economic priority.

Key words: Sustainable economy, strategic priority, stakeholders.

INTRODUCTION

A sustainable economy is the dream of all political leaders, economists, managers and mainly all human beings, in general, if the country's economy is stable, there will be growth. However, this dream has remained unachievable in Nigeria due to the numerous challenges of political instability, corruption and unstable economy in the country. A look at the leadership of Nigeria shows a repetition of leaders and a continuous recycle from the time of military rule to date; this has exposed Nigeria to corruption at all levels leaving the country's economy unstable. This paper tries to look at how Nigeria can achieve a sustainable economy by prioritizing her strategic objectives with regards to the acceptable

stakeholders. Indeed, the quest for sustainability management is not working out because of the latest trending issues of the explosion of the Nigerian population from 139 million in the year 2005 to a whopping 189 m in 2016 as shown in the Table 1.

On a critical look at these population figures, one would ask the question; what has the government and people of Nigeria done to sustain the country's economy to handle or deal with the explosion in the country's population. It has led to growing environmental concerns ranging from the global problem of ozone layer depletion due to the greenhouse effect (Dragulanescu and Dragulanescu, 2016). These unstable environment, has also led to

Table 1. Nigerian population, year and percentage increase.

Year	Population	Yearly % Change
2016	189,987,563	2.63
2015	182,201,962	2.71
2010	159,424,742	2.69
2005	139,611,303	2.59

Source: www.worldometers.info/world-population/nigeria-population/

drastic changes in the weather and deforestation, which is a bitter situation in the agricultural sector. Formulation of the traditional approach to the role of agriculture in economic development regarding the contributions the agricultural sector can make or the functions, it can perform during the process of economic development (Suberu et al., 2015).

Statement of the problem

Sustainability is a continuous goal in which we need to keep achieving in Nigeria considering the daily challenges we encounter in our day-to-day operations. This study looks at these existing problems of what can be done in Nigeria to achieve a sustainable economy.

Objective of the study

The sole purpose of this study is to identify strategies that can be used in Nigeria to achieve a sustainable economy.

LITERATURE REVIEW

A review of past literature on this subject has shown that it is necessary to consider the acceptable stakeholders in the Nigerian economy while working towards achieving a sustainable economy. Given this, the current literature attempts a review of how this is possible by first giving insight to the concepts of acceptable stakeholders, sustainable economy, and strategic priorities, also considering the theories of sustainability.

Concept of acceptable stakeholders

Everyone that is living in the country today can be seen as important, these includes the Nigerians and the aliens because they contribute to the economy in one way or the other. Stakeholders are all parties who are affected by the activities of an organization or who affect an organization (Ogundele and Olajide, 2006). In this study, the acceptable stakeholders are narrowed down to the people in Nigeria who directly impact on the economy in one way or the other either by the decisions they make or

by the policies and laws they will have to abide. These stakeholders are the government, citizens, the environment, the investors and all the entities in Nigeria. The global nature of the world economy today shows the whole earthly beings as stakeholders; this is because a new technology developed in China today can quickly change the way of doing business in Nigeria. Bearing the government's commitment in mind with the objectives, policies, and mechanisms for achieving sustainable development, everyone involved will have to come together to attain this goal and make it a reality. These require the forging of a partnership with all the stakeholders (Adegoke et al., 2000).

Sustainable economy

A sustainable economy is not only that which is profitable at a given point in time but also an economy that can sustain all its good from one generation to the other. Sustainability means meeting our needs without compromising the ability of future generations to respond to their needs (Kuhlman and Farrington, 2010). In addition to natural and mineral resources found in the environment, we also need social and economic resources (Steiner, 2008). Thus, sustainability is not just environmentalism. Embedded in the definition of sustainability is the thought of sustainability to mean, 'the ability to sustain' for social equity and economic development. The concept of sustainable economy and development includes narrowing the gaps between rich and developing countries because of these deficiencies or weaknesses if not reduced or closed will cause more problems in the society instead of leading to economic development in a country. Achieving sustainability in Nigeria is to establish an economy that is viable, environmentally sound and socially responsible. The concept of sustainability has been there for years, and it was initially seen as an operational concern, consisting of mostly defensive efforts to reduce companies' environmental footprints and cut waste (Yvon et al., 2011). In the process of improving the livelihood of the world's poorest countries, who depend mostly on fields, forests, and waters, the maintenance of healthy ecosystems[1] is

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[1] Healthy ecosystem is a safe biological environment that living organisms can live and interact.

essential to achieve the goal of ensuring environmental sustainability (Steiner, 2008). Achieving this aim requires participation from all sectors of the economy, both to determine the needs of the people and to identify and implement innovative and appropriate solutions. Sustainability can be seen as an entity's ability to maintain a trend of quality, knowing full well that the peoples' bargain hunting [2] would align perfectly with business practices that sustain a healthy and just world. Thus, powerful market forces [3] are in the service of sustainability's goals (Yvon et al., 2011). Long term viability [4] of the local economies can be achieved and depends on the cooperation in a competitive economy, to avoid damaging the side effects of these competitions. A sustainable economy for a country, when considered, is all encompassing and cuts across all the facets of the economy. Economic sustainability forms an essential component of sustainable development; it is the achievement of development by maintaining and sustaining the real high growth rate in a country's economy (Erhun, 2015). Otive (2015) has it that despite the enormous resources in Nigeria, the country, ranks low in financial performance. The country has not achieved the growth rate necessary to reduce poverty (Erhun, 2015). Considering long-term sustainability shows that Nigeria suffers from a lack of balanced development where economic, social and environmental dimensions are. The federal government should follow up the implementation of feasible and viable projects that can enhance the sustainability of the Nigerian economy in line with its change agenda (Otive, 2015). To achieve the Post-2015 Development Agenda in Nigeria, we need to measure continuously and manage the country's sustainable development. Economic, social and ecological dimensions are integrated using a holistic approach due to the multiple challenges to development in Nigeria (Erhun, 2015).

Strategic priority

In the run for achieving a sustainable economy in the country, there is a continuous need to work the path of sustainability bearing the stakeholders in mind while considering strategic objectives. That is why Lauer (2008) points out that for a leader, developing a strategy in his organization or for the people is a never-ending job of crafting the storyline for success, and it is rarely a clear vision and also an evolving story that starts off wrongly. It gets continuously revised and becomes more apparent and strategic with continuous decisions and judgments (Lauer, 2008). Economic boosts driven strategies are all geared towards a better society that would alleviate

poverty and encourage independence and growth in the nation (Udunze et al., 2014).

According to Iwala (2014), some of the strategies that have been tried in Nigeria in the past with the aim of providing food, employment and other basic amenities for the people and a sustainable economy are:

i) National Accelerated Food Production Program and the Nigeria Agricultural and Cooperative Bank (1972).
ii) Operation Feed the Nation: to teach the rural farmers how to use modern farming tools (1976).
iii) Green Revolution Program: to reduce food importation and increase local food production (1979).
iv) Directorate of Food, Roads, and Rural Infrastructure (DFFRI) (1986).
v) National Directorate of Employment (NDE) (1987).
vi) Family Support Program and the Family Economic Advancement Program (1993).
vii) National Poverty Eradication Program (NAPEP) to replace the previously failed Poverty Alleviation Program (2001).
viii) National Economic Empowerments and Development Strategy (NEEDS) (2004).

The strategies mentioned above made little or no impact on the Nigerian economy, because of the problems of corruption and the political instability in the country. The NEEDS was the last of these strategies that came up in 2004 as a public policy geared towards the fulfillment of the obligations of government to the citizens. In the quest to maintain law and order, provide the necessary social and economic activities which are essential and required by the people over an extended period (Udunze et al., 2014).

Strategic priorities rank strategic objectives by importance towards achieving strategic goals, with the allocation of necessary resources, operational and tactical planning. A sustainable economy involves development that covers three dimensions: economic, social, and environmental. Sustainable strategies in the Nigerian economy should be in consideration for social responsibility, environmental protection, and economic prosperity.

Social responsibility

Social responsibility is the contribution made by organizations to support the development of the environment (Bassey, 2011). It looks at what the entity has to offer to the society as a whole; it is the entities' obligation or duty to the environment, which will ensure balance within the economy and the ecosystem. Also, Robbins et al. (2011) stressed that social responsibility reflects an entities' commitment to do the right thing for the society. The entity here could be an individual, business or an organization. If all the entities adopt social

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[2] Bargain hunting; a quest for periodical investments eg stocks
[3] Market forces: the economic factors affecting the price, demand, and availability of a commodity
[4] Viability is an entities ability to maintain itself or recover its potentialities.

responsibility in the country, it will be easy to drive the strategic priorities, which involves the provision of the basic amenities like stable power supply, good roads, water supply and education. If the electricity supply is stable, it will aid the lifestyle of the people and reduce the running cost of businesses, especially the small and medium scale businesses that will have to run on generators in the absence of power supply. The necessity of good roads in Nigeria cannot be over-emphasized; most of the federal roads in the country are no longer pliable (like the Enugu-Onitsha Expressway due to different levels of road decay, erosion, and poor road construction), thus resulting in increasing the cost of transportation from one point to the other along this axis. If the roads are good, there will be a smooth flow of businesses via transportation of goods and services.

Environmental protection

The world we live in is our environment; it is an asset all human beings share in common, so the responsibility of protecting the earth is common to all men. The environment is at the center of the concern for environmental sustainability meaning that the next thing to man's life is his environment (Erhun, 2015). Environmental protection means protecting the environment, an individual, an organization from harm. Due to the rise in activity and new technological advancement, the springing up of industries continuously degrades our environment (that is the built environment and the natural environment), sometimes this degradation stays permanently (Medupin and Adedoyin, 2000).

The stakeholders in the Nigerian economy needs to consider its context of business knowing that, it is vital to the economy. To achieve this will be by upholding the intergenerational equities. The people of today's generation utilizing the natural resources available so that there will be enough to carry the future generation, and the intra-generational equity; equally using and sharing the natural resources of today within the people of today (Anand and Sen, 2000). Environment protection is there to provide a balance in the environment between human beings and the other components of the environment (Dragulanescu and Dragulanescu, 2013). The environmental protection laws should be compulsorily enforced to eliminate the damage to the environment because a well-protected environment enhances growth, development, and a sustainable economy. Environmental protection will benefit the country by; minimizing decay of natural and social environment, reducing poverty and disharmony/conflict in Nigeria (Medupin and Adedoyin, 2000).

Economic prosperity

The state of Nigerian economy always needs to be considered, and we need to look critically at the situation of the nation's wealth at all times.

According to one of the former Central Bank of Nigeria Governor, Sanusi Lamido Sanusi. "One way of achieving economic prosperity is by collaborating with the banking system to fix the value chain problems in the agricultural sector, since economic development is about enhancing the productive capacity of an economy by using available resources to reduce risks, and remove impediments which, otherwise, could hinder investment." Economic benefits can get to the poor by the use of strategic objectives that enhance poorer households and the informal economy. It is also necessary for micro, small and medium-sized businesses to generate more jobs worldwide, and boosting a nation's economy is one of the best ways to tackle poverty reduction (Iwala, 2014). Economic prosperity looks at how wealthy and fruitful is the country's social status showing if the Nigerian economy is flourishing and thriving with good fortune. Progress in each sector of a country's economy spurs advances in the others, with the result that the long-sought alignment of the stakeholders' prosperity with the best interests of the country seems not only possible but inevitable (Yvon et al., 2011). Economic prosperity can be achieved in Nigeria, if the government; invests in agriculture to provide food in the country for all, deregulate the oil sector of the economy thereby attracting more investments in oil refineries in Nigeria and introduce healthy competition in the industry which will attract foreign direct investments.

METHODOLOGY

The study adopted a quantitative historical research based on the review of the relevant past and present on the subject matter. The following works were reviewed and formed the basis of this research work (Table 2).

THEORETICAL FRAMEWORK FOR SUSTAINABILITY

The theories of development are the ultimate theoretical explanations to interpret the need for durability and considering the efforts that have been carried out in Nigeria. These theoretical perspectives (Modernization, Sustainable Development, and Human Development) are used to clarify the concepts (of the acceptable stakeholder, sustainable economy, and strategic priority), set them in economic and social perspectives, and also to identify recommendations concerning social policies.

Theory of modernization

The modernization theory as proposed in the 1960s by Walt Rotsow has it that technology and science can be used to advance the industry and stimulate economic

Table 2. List of reviewed literatures.

Author	Title	Source
Mercy O. Erhun	A Sustainable Approach to Economic Development in Nigeria: A Legal Perspective	Journal of Economics and Sustainable Development
1. Akintoye Victor Adejumo 2. Opeyemi Oluwabunmi Adejumo	Prospects for Achieving Sustainable Development Through the Millennium Development Goals in Nigeria	European Journal of Sustainable Development
Country Report to the Rio+20 Summit	Nigeria's path to Sustainable Development through Green Economy	United Nations Conference on Sustainable Development
1. Kevin Urama 2. Nicholas Ozor 3. Ernest Acheampong	Achieving Sustainable Development Goals (SDGs) Through Transformative Governance Practices and Vertical Alignment at the National and Subnational Levels in Africa	SDplanNet www.sdplannet-africa.org Sharing tools in planning for Sustainable Development
Iwala Oladapo Sam	Achieving Sustainable Poverty Reduction and Rural Development in Nigeria through Local Economic Development Strategies	American Journal of Rural Development
1. Orishede Felix 2. John O. Ogbor	The Quest for Sustainable Development: Strategies for Managing Stakeholder Relationships	European Journal of Business and Management
1. Kelly Bryan Ovie Ejumudo 2. Florence Ogochukwu Nwador	Environmental Management and Sustainable Development in Nigeria's Niger Delta	Journal of Economics and Sustainable Development
Organisation for Economic Co-operation and Development	Strategies for Sustainable Development: Guidance for Development Co-operation	Organisation for Economic Co-operation and Development

Source: Researchers.

growth of a nation. Development will be achieved in a country when it has high industrial outputs and exports goods to the world economy (Global Learning Programme). Modernization Theory focuses on cultural change directed at institutional structures in non-industrialized countries.

It stresses the importance of political development in the progress and climactic improvement of a nations' economic standing, and it also acknowledges social and cultural reforms. Rotsow, (1962) saw modernization of a country from two perspectives to provide advantages and disadvantages to the economy:

Advantages (Positives)

i) it avails the country with a clear course for development.
ii) The 'take-off' stage simulates rapid growth.
iii) Economic growth will provide Jobs and increased standards of living.

Disadvantages (Negatives)

i) Outdated and eurocentric, as modeled to enrich wealthy nations further

ii) Industrial revolutions and economic growth will lead to deforestation and degradation of the environment

He also identified the following five stages to economic 'take-off' namely;
i) traditional society,
ii) preconditions to take-off,
iii) take-off,
iv) drive to maturity, and
v) age of mass consumption.

Traditional society: Basic, subsistence farming with some local trade and bartering in our rural communities which is famous for a limited range of production. Our rural communities were affected by their inability to understand the capabilities of the environment, a shortage of technology and lack of advanced tools which limited their production. It represented a biased social classification pattern with the political point of focus in a particular region.

Preconditions to take-off: this involves mechanized and commercial agriculture with the advent of specialist industries. The initial move from traditional society in

Nigeria stemmed from the colonization of Nigeria by Britain which brought development of modern science and ideologies and the subsequent discoveries of natural resources and crude oil that led to the increase in trade, and the competitive struggles to gain our independence.

Take-off: Industrial revolution causes rural-urban migration and while the infrastructures improve some regions experience rapid growth. This stage commences from the increase of new industries with the use of advanced technologies, example textile, and railroads.

Drive to maturity: this involves establishing a range of industries and a decline of early 'take-off' industries. Sophisticated transport network starts developing with a widespread of latest innovations and technology. This phase is the time of expansion in which some new fields developed into rivals of old sectors.

Age of mass consumption: at this level, the tertiary sector experiences rapid growth with industry shifts to produce consumer goods. High disposable incomes result in the mass consumption of goods. As a society recognizes its need for greater security, welfare, and leisure to its labor, it gets to the point of mass consumption which leads to the provision of extensive private use of quality goods, and an extension of international authority for the country. At this point, the country also starts asking for support from other developed countries and this support comes with conditions from the foreign country providing the aid (Shareia, 2015). Rostow (1962), also has it that on the road to maturity and mass consumption, accounting plays a vital role in latest innovations. The maturity and mass consumption are attractive, but the Theory of Modernisation ignores the challenges of the developing countries because the accounting system is meant to satisfy shareholders. The role of accounting systems in developing countries is inevitably the adoption of those from developed countries. In the Nigerian situation, this theory proposes providing the government with a clear course for development and economic growth with job opportunities and increased living standards.

Theory of sustainable development

This theory as proposed by the former Prime Minister of Norway, Gro Harlem Brundtland in the 1980s. She has it that considering environmental factors; sustainable development 'meets the needs of the present without compromising the ability of future generations to respond to their needs' (Global Learning Programme). Sustainable development in Nigeria will ensure that future generations have the right to a high standard of living, prevent the crises in resources, show the need for national quality and create the awareness of environmental, economic and social needs of the acceptable stakeholders (Abbas, 2011). In line with this theory, the social, economic and ecological factors in Nigeria will have to be bearable, viable and equitable for us to be able to achieve sustainable economy in the country.

Human development theory

In the 1990s, the Indian philosopher and economist Amartya Sen proposed that human development is not solely dependent on economic improvement alone. To him, development means that individuals have the freedom to make life choices, so the social, cultural and political dimensions are necessary. The human development theory further proposes five livelihood assets (natural capital, financial capital, human capital, social capital and manufactured or physical capital) in line with the Five capital model (Global Learning Programme). The Five Capital model of Sustainable Development was also reviewed in this work and seen as a possible means of achieving a sustainable economy. This model as adopted from this theory by Forum for the Future in the 1990's, looks at the various parts of the economy and development equation in such a way that decision makers, business people, and leaders in Nigeria can form capitally enhanced balanced plans. The model describes the five capitals thus:

Natural capital: Nigeria has lots of mineral resources (petroleum, coal, natural gas, etc.) deposited in vast quantities across the country. However, as businesses successfully create more goods and jobs, consumer demand soared, compounding the destruction of natural capital. Thus natural capital looks at these natural resources and processes needed by Nigerians to produce their products and deliver their services.

Social capital: this is any value added to the activities and economic outputs of an organization by human relationships, partnerships, and cooperation (Grootaert and Van Bastelaer, 2001). Social capital in Nigeria cuts across the social atmosphere of the society which includes our organizations, people and their interactions, the religion, and culture existing in the country. It is necessary for Nigeria to help balance our tribal and ethnic differences which is one of the leading causes of the unstable economy (Erhun, 2015).

Human capital: this incorporates the health, knowledge, skills, intellectual outputs, motivation and capacity for relationships of the individual. It considers that there are investments in people through education, training, health and that these investments increase an individual's productivity (Goldin, Claudia; National Bureau of Economic Research, 2014). Nigeria has lots of untapped human capital; there are lots of Nigerian professionals
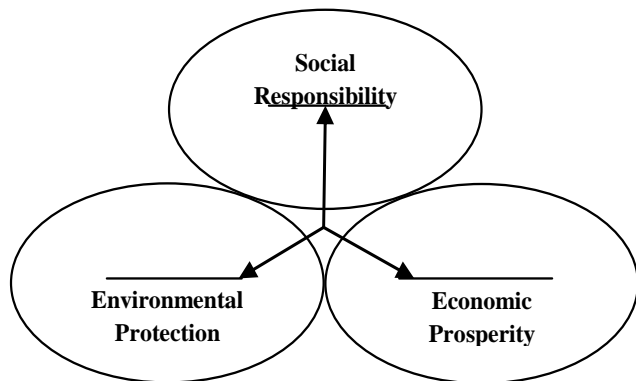
Figure 1. The triple-bottom-line strategies. Source: Researchers.

overseas who cannot come back to work in our country Nigeria because the environment is not enabling. These citizens need the opportunity to come back and serve the country in their different capacities.

Manufactured or physical capital: refers to the tangible assets owned by the organization these include; machines, equipment, facilities building and all forms of support. Produced assets are goods inherited, acquired or built over time using the human resources in the organization, whether in the business sector, in homes or communities, or in the public purpose area of governments and non-profits (Goodwin, 2003). The manufacturer has the environmental responsibility of continuous development of innovative solutions that favor sustainable development (Dang and Sui Pheng, 2015). Nigeria's manufacturing sector has continuously declined over the years due to the epileptic power supply, the paucity of investments in modern equipment, and adverse competition from smuggled products. There has been low capacity utilization and the whole subsectors like textiles and tires diminishing (Okonjo-Iweala, 2012). Nigeria needs to be consistent in her manufacturing to be able to reduce the rate of importation of goods and attain economic sustainability.

Financial capital is the muscle with which the four other resources can operate, and includes those assets of an organization that exists in the form of currency that can be owned or traded. Money is regarded as capital stock if invested in the production of commodities – at least if it can multiply itself (Goodwin, 2003). This type of resource is necessary for the race of achieving a sustainable economy and is of top priority in Nigeria. Especially since used in international transactions to accommodate ownership. Financial capital is necessary and needs to be attained by all entities and organizations to be able to survive.

The transformation of the Nigerian economy needs adequate attention paid to human development; this is

because we have some of the worst human development indicators which are not on track to meet most of the health and education Millennium Development Goals [5] (Okonjo-Iweala, 2012). A balanced mix of these five assets discussed above is what every country needs to be able to run efficiently and sustainably.

Conclusion

Achieving a sustainable economy in Nigeria is a process that is all encompassing and requires the active involvement of all the stakeholders concerned. The development theories analyzed in this work shows that a sustainable economy is possible and can be achieved based on the acceptance of social, economic and environmental dimensions by all the stakeholders in Nigeria. The Human Development Theory proposed the Five Capitals that provides a basis for sustainable development regarding the economic concept of wealth creation or 'money.' Nigeria needs to utilize these five types of capital to deliver their products or services towards achieving a sustainable nation, maintain and develop her economy by nurturing the natural resources and the environment, rather than contribute to its depletion or degradation.

RECOMMENDATIONS

Here the following recommendations are made in line with the theories and concepts earlier discussed.

i) The Five Capitals (natural capital, financial capital, human capital, social capital and manufactured or physical capital) should form the basis and foundation of achieving economic sustainability in Nigeria. Therefore, an equitable balance of these resources is paramount in the Nigerian economy.
ii) We also recommend the triple-bottom-line strategy as a strategy for achieving a sustainable economy in Nigeria. This approach strikes a balance between the three factors considered a necessity in the country; social responsibility, environmental protection, economic prosperity as shown in the figure below as the three stands of a tripod, they are tightly fused to each other as none is more important than the other. The triple-bottom-line as shown in Figure 1 looks at an evenly mixed combination of its three components. Thus it proposes that to achieve a sustainable economy these three elements must be evenly balanced in Nigeria. In line with the use of the triple-bottom-line strategy as a strategy for sustainability in Nigeria the following are necessary:

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[5] Millennium Development Goals (MDGs) are the world's time-bound and quantified targets for addressing extreme poverty in its many dimensions-income poverty, hunger, disease, lack of adequate shelter, and exclusion-while promoting gender equality, education, and environmental sustainability.

i) investments in agriculture to provide food in the country for all,

ii) deregulation of the oil sector of the economy thereby attracting more investments in oil refineries in Nigeria and introduce healthy competition in the industry and

iii) the attraction of foreign direct investments.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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