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Dr. Munir Ahmad
Editor

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DATA MINING ALGORITHMS IN THE FIELD OF CANCER

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ABSTRACT

Data mining is that branch of computer science in which a meaning full knowledge can be obtained from a large amount of data. In this paper data mining algorithms will be applied on the data knowledge from the field of cancer. The outcome produced by such algorithms will be given to the experts of the field. They may use the results for the purpose of placement and arrangement of the data.

KEYWORDS

Knowledge, Algorithm, Meaningful, Purpose, Field.

1. INTRODUCTION

Data Mining is the discovery of hidden information found in databases [6][7]. Data mining functions include clustering, classification, prediction, and associations. One of the most important data mining applications is that of mining association rules. Association rules, first introduced in 1993 [1], are used to identify relationships among a set of items in a database. These relationships are not based on inherent properties of the data themselves, but rather based on co-occurrence of the data items. Our emphasis in this paper is on the basket market analysis data. Various algorithms have been proposed to discover frequent itemsets in transaction databases.

The AIS algorithm is the first published algorithm developed to generate all large itemsets in a transaction database [1]. This algorithm has targeted to discover qualitative rules. This technique is limited to only one item in the consequent. This algorithm makes multiple passes over the entire database.

The SETM algorithm is proposed in [2] and motivated by the desire to use SQL to calculate large itemsets [3]. In this algorithm each member of the set large itemsets, Lk, is in the form <TID, itemset> where TID is the unique identifier of a transaction. Similarly, each member of the set of candidate itemsets, Ck, is in the form <TID, itemset>. Similar to [1], the SETM algorithm makes multiple passes over the database.

The Apriori algorithm [4] is a great achievement in the history of mining association rules. It is by far the most well-known association rule algorithm. This technique uses the property that any subset of a large itemset must be a large itemset.

The Off-line Candidate Determination (OCD) technique is proposed in [5], and is based on the idea that small samples are usually quite good for finding large itemsets.

The OCD technique uses the results of the combinatorial analysis of the information obtained from previous passes to eliminate unnecessary candidate sets.

Sampling [8] reduces the number of database scans to one in the best case and two in the worst. A sample which can fit in the main memory is first drawn from the database. The set of large itemsets in the sample is then found from this sample by using a level-wise algorithm such as Apriori.

Each association rule mining algorithm assumes that the transactions are stored in some basic structure, usually a flat file or a TID list, whereas actual data stored in transaction databases is not in this form. All approaches are based on first finding the large itemsets. The Apriori algorithm appears to be the nucleus of all the association rule mining algorithms.

This paper proposes a novel technique which don't require that large itemsets first be found rather it is based on calculating the similarity distance among the items. The intuition behind this technique is that similar items are in close proximity to each other and dissimilar items are far a part. The distance between items approaching zero are similar and the distance between items approaching one are dissimilar.

This paper is divided into 7 sections. Section 2 formerly describes the problem of association rule mining. Section 3 discusses the logical data analysis methods. presents the proposed technique. The algorithm and conclusion are shown in section 4 and 5, respectively.

2. ASSOCIATION RULE PROBLEM

A formal statement of the association rule problem is as follows:

Definition 1:

[1][9] Let I = { i_1, i_2, ..., i_m} be a set of m distinct attributes. Let D be a database, where each record (tuple) T has a unique identifier, and contains a set of items such that $T \subseteq I$. An *association rule* is an implication of the form of $X \Rightarrow Y$, where X, $Y \subseteq I$ are sets of items called itemsets, and $X \cap Y = \varphi$. Here, X is called antecedent while Y is called consequent; the rule means $X \Rightarrow Y$.

Two important measures for association rules, support (s) and confidence (α), can be defined as follows.

Definition 3:

[1][9] For a given number of records, *confidence (α)* is the ratio (in percent) of the number of records that contain $X \cup Y$ to the number of records that contain X.

Association rules can be classified based on the *type of vales*, *dimensions of data*, and *levels of abstractions* involved in the rule. If a rule concerns associations between the presence or absence of items, it is called **Boolean association rule**. And the dataset consisting of attributes which can assume only binary (0-absent, 1-present) values is called **Boolean database**.

3. LOGICAL DATA ANALYSIS

The logical analysis of data was originally developed for the analysis of datasets whose attributes take only binary (0-1) values [10, 11, 12]. Since it turned out later that most of the real-life applications include attributes taking real values, a "binarization" method was proposed in [13]. The purpose of binarization is the transformation of a database of any type into a "Boolean database".

Table 1:
Original Database

ID	Age: 20-29	Age: 30-39	M-Status: Single	M-Status: Married	. . .
1	1	0	1	0	. . .
2	0	1	0	1	. . .

LAD is a methodology developed since the late eighties, aimed at discovering hidden structural information in Boolean databases. LAD was originally developed for analyzing binary data by using the theory of partially defined Boolean functions. An extension of LAD for the analysis of numerical data sets is achieved through the process of "binarization" consisting in the replacement of each numerical variable by binary "indicator" variables, each showing whether the value of the original variable is present or absent, or is above or below a certain level. LAD has been applied to numerous disciplines, e.g. economics and business, seismology, oil exploration, medicine etc. [14].

Logical Analysis of Data (LAD) is one of the techniques used in data analysis. Unlike other techniques, which involve probabilistic and geometric analysis, LAD uses logical rules to analyze observations. Its main purpose is to detect hidden patterns in the data set that distinguish observations of one class from the rest of the observations.

3.1 Binarization

The methodology of LAD is extended to the case of numerical data by a process called *binarization*, consisting in the transformation of numerical (real valued) data to binary (0, 1) ones. In this [15] transformation we map each observation $u = (u_A, u_B, ...)$ of the given numerical data set to a binary vector $x(u) = (x_1, x_2, ...) \in \{0, 1\}^n$ by defining e.g. $x_1 = 1$ iif $u_A \geq \alpha_1$, $x_2 = 1$ iif $u_B \geq \alpha_2$, etc, and in such a way that if u and v represent, respectively, a positive and negative observation point, then $x(u) \neq x(v)$. The binary variables x_i, i = 1,2, …, n associated to the real attributes are called *indicator variables*, and the real parameters α_i, i = 1, 2, …, n used in the above process are called cut points.

The basic idea of binarization is very simple. It consists in the introduction of several binary attributes associated to each of the numerical attributes; each of these binary attributes is supposed to take the value 1 (respectively, 0) if the numerical attribute to which it is associated takes values above (respectively, below) a certain threshold. Obviously the computational problem associated to binarization is to find a minimum number of such threshold values (cutpoints) which preserve the essential information contained in the dataset, i.e. the disjointness of the sets of (binarized) positive and negative observations.

In order to illustrate the binarization of business datasets, let us consider the examples presented in Table 1. A very simple binarization procedure is used for each variable "age" and "marital status". Quantitative attributes such as "age" is divided into different ranges like age: 20..29, 30..39, etc. The "marital status" variable is divided into binary values by converting its domain values into attributes.

Table 2:
Boolean Database

ID	Age	marital status	# cars
1	23	single	0
2	38	Married	2

3.2 Binary Variables

A *binary variable* has only two states: 0 or 1, where 0 means that the variable is absent, and 1 means that it is present. If all binary variables are thought of as having the same weight, we have the 2-by-2 contingency table of table 3, where q is the number of variables that equal 1 for both items i and j, r is the number of variables that equal 1 for item i but that are 0 for item j, s is the number of variables that equal 0 for item i but equal 1 for item j, and t is the number of variables that equal 0 for both item i and j. The total number of variables is p, where $p = q + r + s + t$.

Table 3:
A Contingency Table for Binary Variables

		Item j		
		1	**0**	**Sum**
Item i	**1**	Q	R	q + r
	0	S	T	s + t
	Sum	q + s	r + t	P

For noninvariant similarities, the most well-known coefficient is the Jaccard dissimilarity coefficient, where the number of negative matches t is considered unimportant and thus is ignored in the computation:

$$d(i,\ j) = \frac{r + s}{q + r + s}$$

The measurement value 1 suggests that the objects i and j are dissimilar and the measurement value 0 suggests that the objects are similar.

3.3 The Algorithms

This algorithm is designed to work on Boolean databases. Binarization technique must first be applied to convert transactional data into Boolean database. The algorithm can best be explained using an example. Consider the following market basket data which has been transformed into Boolean format.

Table 4:
Market basket data in Boolean format

	I_1	I_2	I_3	I_4	I_5
T_1	1	1	0	0	1
T_2	0	1	0	1	0
T_3	0	1	1	0	0
T_4	1	1	0	1	0
T_5	1	0	1	0	0
T_6	0	1	1	0	0
T_7	1	0	1	0	0
T_8	1	1	1	0	1
T_9	1	1	1	0	0

First column of the Table 4 indicates the transactions from 1 to 9 and subsequent five columns indicate the items purchased. Zero (0) means absence of the item and one (1) means it is present.

In order to use Jaccard's coefficient to find frequent itemsets we use K maps to arrange q, r and s. To find whether I_1, I_2 are frequent items we arrange K-Map for q, r and s as shown in the Table 5 below.

Table 5:
K-Map for two items

	I1'	I1
I2'	0	2
I2	3	4

where $d(I_1, I_2) = 2+3/4 = 0.55$. If d < φ then I_1, I_2 are declared frequent itemsets. Similarly for other itemsets of size greater then 2, K-Maps of different sizes are constructed and their distances are computed respectively according to the technique.

3.4 Common steps from the Algorithm

Input
   Φ User specified threshold between 0 And 1
   T Binary transactional Database

Output
Frequent itemsets
   1) p = { $i_1,i_2,.....i_n$} set of data items in transactional database.
   2) Create K Map for all the permutation in row.
   3) Scan the transactional database and put the presence for every combination of data items in corresponding K Map for every permutation of row.

4) For every permutation of p:

   a) Calculate dissimilarity using K Map Constructed for every permutation using the following Jacquard's dissimilarity equation.

$$d(i_1,i_2,\ldots.i_n) = \sum_{i1=0}^{1} \sum_{i2=0}^{1} \sum_{i3=0}^{1} ,\ldots\ldots \sum_{in=0}^{1} f(i_1,i_2,\ldots.i_n)f(0,0,\ldots.0) -$$

$$f(1,1,\ldots\ldots1)/f \sum_{i1=0}^{1} \sum_{i2=0}^{1} \sum_{i3=0}^{1} ,\ldots\ldots \sum_{in=0}^{1} f(i_1,i_2,\ldots.i_n) - f(0,0,\ldots.0).$$

   b) If d < Φ then $i_1,i_2,\ldots.in$ are frequent .

Figure 4.1 Distance-based association rule mining algorithm
- In step first the data in binary transactional database and a user specified threshold value is provided to the algorithm (input for the algorithm).
- In second step k-map is generated for all the permutation in row on the base of formula given above.
- In step three the whole database scan process is performed to put the presence for every combination of data item in corresponding k-map for every permutation of row.
- In step four the dissimilarity is calculated bases on jacquard's dissimilarity coefficient.
- Now in the last step the d value is compared with the user supplied threshold and if dissimilarity is less the user specified threshold then its will be added to the frequent item list else the value will be discarded and in the last the algorithm will display the frequent item list.

4. EXPERIMENTAL RESULTS

The experiments were performed to check the results and accuracy of the algorithm. The algorithm requires the data in the database to be in binary format. So we download the dataset transa from the net. The data was stored in a text file on the site [18]. The data was in a format:

```
0 1 0 0 1 0 0 1
1 1 0 0 1 1 0 0
0 1 1 0 0 1 0 1
```

The algorithm was coded in ORACLE 10g using laptop computer having 20GB hard drive and 1.6MH processor. We use oracle for the development because it provides the facility of grid computing. And also ORACLE is a powerful database. Oracle is also a self-sufficient database having its own front and back end facility. We create a table in the database to store the data for the purpose of experiment. To load the data to the database oracle provide a facility by making a control file and then by using sql loader. We first convert the data into a format that the item now is separated by commas instead of spaces. Now the data is loaded to the table with the help of sql loader and look like

```
0,1,0,0,1,0,0,1
1,1,0,0,1,1,0,0
```

0,1,1,0,0,1,0,1

After loading the data into table the algorithms are implemented on the database having ten thousand records.

4.1 SI algorithm

Fig. 1: SI Algorithm

First the experiment is performed with the proposed (SI) algorithm. For the experiment input threshold was 80% (dissimilarity). The results generated by the algorithm on the given support are given below.

Dissimilarity	Threshold	Status
.71	.8	Item1 and item2 are frequent
.38	.8	Item1 and item3 are frequent
.33	.8	Item1 and item4 are frequent
.73	.8	Item1 and item5 are frequent
.64	.8	Item2 and item3 are frequent
.71	.8	Item2 and item4 are frequent
.79	.8	Item2 and item5 are frequent
.5	.8	Item3 and item4 are frequent
.75	.8	Item1 and item2 and item3 are frequent
.53	.8	Item1 and item3 and item4 are frequent

Fig. 2: SI Algorathim Results

From results it is clear that the largest frequent item generated by the algorithm are

I_1, I_2, I_3

I_1, I_3, I_4

4.2 Apriori Algorithm

Next to verify the results the same data is provided with the same support (similarity) twenty percent to Apriori algorithm. Twenty percent because Apriori work on similarity while SI work on dissimilarity. That's why input threshold for SI algorithm was .80% while for Apriori it is 20%.

SI	APRIORI			

Apriori Algorathim

Item1	Item2	Item3	Item4	Item5
0	1	1	0	0
0	0	1	0	1
1	0	1	1	0
1	1	1	0	0
1	0	1	1	0
1	0	0	1	1
1	0	1	1	0
0	0	0	1	1
1	1	1	1	0
1	1	1	1	0
0	1	0	1	1
0	0	0	0	0
1	0	1	1	1
1	1	1	1	1
0	1	0	0	0

Fig. 3: Apriori Algorathim

After giving the data to Apriori algorithm it is also generate the same results with the same largest frequent item sets contain.

Apriori Algorathim Results

Minimum Support	Support Count	Status
20	4838	i1 is frequent
20	3868	i2 is frequent
20	5332	i3 is frequent
20	4848	i4 is frequent
20	4344	i5 is frequent
20	1938	i1 and i2 is frequent
20	3878	i1 and i3 is frequent
20	3878	i1 and i4 is frequent
20	2423	i2 and i3 is frequent
20	1938	i2 and i4 is frequent
20	3393	i3 and i4is frequent
20	2424	i4 and i5 is frequent
20	1938	item1 ,item2 and item3 are frequent
20	3393	item1 ,item3 and item4 is frequent

Fig. 4: Apriori Algorathim Results

I_1, I_2, I_3
I_1, I_3, I_4

Now after getting the results from both the algorithm it is very clear that both generate the same largest frequent item list. But the main difference between Apriori and SI algorithm is that Apriori calculate similarity to generate the frequent item list while SI algorithm uses dissimilarity to perform the same task.

Now we have to load more data in database to check the performance. After loading more data to the database the total records in the database are 19350. When we apply Apriori and SI algorithms on the updated database, the result produced are given.

Apriori Algorathim Results

Minimum Support	Support Count	Status
20	4838	i1 is frequent
20	3868	i2 is frequent
20	5332	i3 is frequent
20	4848	i4 is frequent
20	4344	i5 is frequent
20	1938	i1 and i2 is frequent
20	3878	i1 and i3 is frequent
20	3878	i1 and i4 is frequent
20	2423	i2 and i3 is frequent
20	1938	i2 and i4 is frequent
20	3393	i3 and i4is frequent
20	2424	i4 and i5 is frequent
20	1938	item1 ,item2 and item3 are frequent
20	3393	item1 ,item3 and item4 is frequent

Fig. 5: Apriori Algorathim Results

SI Algorathim Results

Salam Irshad

Dissimilarity	Threshold	Status
.71	.8	Item1 and item2 are frequent
.38	.8	Item1 and item3 are frequent
.33	.8	Item1 and item4 are frequent
.73	.8	Item1 and item5 are frequent
.64	.8	Item2 and item3 are frequent
.71	.8	Item2 and item4 are frequent
.79	.8	Item2 and item5 are frequent
.5	.8	Item3 and item4 are frequent
.75	.8	Item1 and item2 and item3 are frequent
.53	.8	Item1 and item3 and item4 are frequent

Fig. 6: SI Algorathim Results

The largest frequent itemset

I_1, I_2, I_3

I_1, I_3, I_4

So this is, once again, both the algorithm produce the same results. We have to load more data to the database.

After this we change the input threshold to check the performance and accuracy at different threshold values. The input threshold is change from .80% to .70% (dissimilarity) for SI algorithm and from 20% to 30% (similarity) for Apriori algorithm. The database contains 154000 records and after applying both the algorithms the results produces are given below.

SI Algorithm Result

Dis	Threshold	Status
.38	.69	Item1 and item3 are frequent
.33	.69	Item1 and item4 are frequent
.64	.69	Item2 and item3 are frequent
.5	.69	Item3 and item4 are frequent
.53	.69	Item1 and item3 and item4 are frequent

Fig. 7: SI Algorithm Result

Apriori Algorithm Result

Minimum Support	Support Count	Status
30	19352	I1 is frequent
30	15472	I2 is frequent
30	21328	I3 is frequent
30	19392	I4 is frequent
30	17376	I5 is frequent
30	15512	I1 and i3 is frequent
30	15512	I1 and i4 is frequent
30	13572	I3 and i4is frequent
30	13572	item1 ,item3 and item4 is frequent

Fig. 8: Apriori Algorithm Result

The largest frequent itemset produce is

I_1, I_3, I_4

After changing the input threshold the results produce by both the algorithms are same. Now this is clear that both algorithms produced the same results at different threshold.

Now as both the algorithm produced the same results so the algorithms are reliable. The results obtained from the algorithm may be use in the field of cancer for the arrangement of patient data. Also it is used for the analysis of the staff and students in this field. The results may be used as a meaningful source for the analysis of cancer databases

5. GRAPHICAL ANALYSIS OF THE RESULTS.

Now to make analysis we have the following graphs for the results produced at different database size by the algorithms.
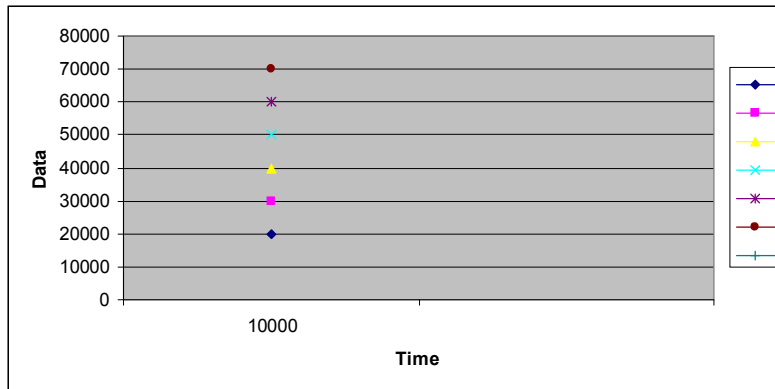
Fig. 9: Graphical Analysis of the Results

6. CONCLUSION AND FUTURE WORK

The results obtained are accurate. These are also reliable. The field experts may analyze the data from the said field. In future the algorithms may be used for further analysis in this field.

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TECHNOLOGY'S ROLE ON STUDENTS BEHAVIOUR

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ABSTRACT

The current era is of technology. Technology refers to all new innovations used for betterment of society. So it is the demand that technology should be used in education also. By keeping this view, now technology is shifting to education also to make teaching-learning process more effective and efficient. Students' learning can improve with the help of instructional technology. Has instructional technology any effect on students' behaviour? How educational technology helpful for long-lasting learning? etc. etc. These questions should be answered properly if we want to improve quality of instruction and to achieve the objectives of education. 200 students of secondary classes from arts and science streams were randomly selected from five Government Secondary Schools of Wah Cantt. A self-developed questionnaire was prepared by analyzing literature. t-test and product moment correlation method was applied for data analyses. Results revealed that there is an impact of audio-visual aids on students' behavior, positive interaction between teachers and pupil is possible, learning will be quick and creativity is possible. It keeps students attentive, students' performance can be improved and learning will be easy. Positive, quick and easy transfer of learning is possible which has permanent impressions on the minds of the students. Positive interaction between teachers, students and subject-matter and students' creativity is enhanced due to instructional aids.

1. INTRODUCTION

When technology applies to educational setting, it is termed as educational technology and when it is used for instruction, it is called as instructional technology. Education technology has both general and specialized meanings. For the layman and educators, it means use of audio-visual aids for instruction. Specialists who teach educational technology as a subject prefer to use word "instructional technology" because it is the practical use of educational technology in classroom for instruction. Instructional technology shows two aspects i.e. process and the particular devices that teachers employ in classroom for the clarification and enhancement of concepts.

According to the Association for Educational Communications and Technology, "Instructional technology is a complex, integrated process involving people, processes, procedures, ideas, machines, devices and organization for analyzing problems and devising, implementing, evaluating and managing solutions to the concerned problems in those situations in which learning is purposive and controlled".

However instructional technology, educational technology, audio-visual aids, educational communication technology, audio-visual media, learning resources,

instructional or educational media are used interchangeably as they have same purpose
i.e. achievement of objectives and goals; and improvement in students' behavior by
learning.

2. INSTRUCTIONAL TECHNOLOGY --- WHY?
PSYCHOLOGICAL PERSPECTIVES

Cobun (1968) (as cited in Aggarwal, 1995) conducted a research in educational
technology and pointed out that:
  1 per cent learning from sense of taste
  1.5 per cent learning from sense of touch
  3.5 per cent learning from sense of smell
  11 per cent learning from sense of hearing
  83 per cent learning from sense of sight

Cobun (1968) (as cited in Aggarwal, 1995) research showed that when sense
experiences are involved in learning, understanding becomes nearly constant and people
generally remember:
  10 per cent when reading
  20 per cent when hearing
  30 per cent when seeing
  50 per cent when hearing and seeing
  70 per cent when saying
  90 per cent when saying as they are doing

Instructional technology is only the tools who give the chance to students to actively
participate in learning. It has been recognized that when our various senses are involved
in any activity, reception of messages become increase.

3. INSTRUCTIONAL TECHNOLOGY AND STUDENTS BEHAVIOR

The main purpose of applying instructional technology in classroom is to maximize
the learning outcomes. Learning is the burning issue for all educational technologists but
the answer is still uncertain that how learning will be increased. Most of the researches
are based on comparative studies in which experimental groups teach with certain
instructional technology i.e. T.V., computer or any device and control groups take
instruction without them. At the end of experiment, researchers compare the performance
of experimental and control groups and difference attributes to the dependent variable.

Some researchers reviewed a lot of literature and come to the conclusion that
whatever instructional technology i.e. T.V., computer, charts, boards, maps, models etc.
is employed by the teachers, ultimately the students' level of understanding will increase.

Both experimental and descriptive studies revealed that proper use of instructional
technology create positive interaction between students and students and teachers and
students. Possibility of quick learning, creative work and positive impact of teaching is
increased. They keep the students attentive and busy in classroom. With the help of them,
opportunities are offered to students to exchange their ideas with other class fellows.
Students' performance is also improved by using them appropriately.

**Create Positive Interaction between Students and Students and
Teachers and Students**

Teaching-learning objectives are effectively realized and achieved when various stimuli are utilized, students are actively involved and vicarious experiences are being provided to the students. All these encourage the healthy student-student and teacher-student interaction. Byk (n.d.) said that posing of discussion question after showing the clip opens the new doors for interactions between students and teachers.

Quick Learning

The objective of learning is quick fixation of new concepts on students' mind. This objective can only be achieved by supplementing lectures with different activities, experiences and other stimuli available to the students. Lavin, Korte and Davies (n.d.) proved that use of technology prove to be helpful in students learning. The amount of students' learning is increased and even students become more desirous to take additional classes from those instructors who utilize audio-visual aids in their classes.

Keep the Students Attentive and Busy in Classroom

Teaching-learning process is based on attentive attitude of students in classroom. To capture and sustain the students' attention and interest in learning, audio-visual aids prove to be helpful. Lowerison, Scalter, Schmid and Abrami (2006) in their study suggested that transformation of learning environment from passive to active is the potential area of audio-visual aids. Similarly Roblyer (2003) proved that learner become more actively involved in his/her learning due to proper and appropriate use of technology in classroom.

According to Epper and Bates (2001), a 2001 national study showed that 87 % of faculty believes that technology enhances students' learning. Furthermore, Lavin, Korte and Davies (n.d.) proved that attentiveness of students is based on appropriate utilization of technology in classroom.

Patil (2010) wrote in his article that audio-visual aids are very helpful to attract and maintain the students' attention. Similarly Sheeshan (2011) argued that incorporation of audio-visual aids into teaching helps the teachers to keep students busy and attentive throughout the lecture.

Possibility of Positive Impact of Teaching

Learning of concepts, facts, and principles and to solve the real problems is possible by the proper utilization of audio-visual aids and by the proper receiving of learning in classroom. Apperson, Laws and Scepansky (2006) conducted a research to check the effect of power point on students' experience. Students gave their views that the classes taught by power point were better organized and more interesting. They also showed their interest to take another class from the same professors as the learning became more interesting and everlasting.

Furthermore Atkins-Sayre, Hopkins, Mohundro and Sayre (1998); Daniels (1999) and Mantei (2000) concluded that instructors' credibility is increased due to technological use

in teaching. Class time can be managed more effectively as less time is wasted on white board writing and teaching may run in better flow.

Lavin, Korte and Davies (n.d) conducted a research on the impact of classroom technology on students' behavior and found that addition of technology in lectures has a positive impact on students' perceptions about the instructors' teaching and most aspects of students' behavior.

Alaku (1998) argued that effective teaching depends upon the appropriate selection of instructional strategy and audio-visual aids make it more powerful and immediate.

Many researches conducted by Deveaney (2009); Brecht and Ogilby (2008); Whatley and Ahmad (2007); Isiaka (2007); Sarker and Nicholson (2005); Fatunmbi (2005); Akpabio (2004); Cuban (2001); and Dunn (2000) showed that teaching-learning process can be improved by appropriate utilization of audio-visual aids in teaching.

Tools to Make Difficult Concepts Easier to Understand
Many concepts are difficult to understand and comprehend. Verbal instruction is based on rote memorization which is the curb of imagination, thinking, reasoning, creativity, enquiry and inventiveness of new concepts. Instruction based on proper use of audio-visual aids develops all these mental faculties. Ayinde (1997) opined that if audio-visual aids are used intelligently then retention of knowledge and stimulation of understating of complex concepts will increase. Similarly Alaku (1998) gave the opinion that students enjoy and understand lessons easily when lectures are supplemented by audio-visual aids.

Byk (n.d) argued that instructional video clip can increase the understanding and enjoyment of students in teaching-learning process. Wahlig (n.d) said that when students interact with the model, they develop a deeper understanding of the object or concept. Brister (n.d) opined that visual aids enable the students to break the information in meaningful way and then manage or sequence it on their own. These aids are helpful to focus students' thoughts and ideas on subject, which in turn help them to understand, analyze and interpret the presented information.

Offer Opportunities to Exchange Ideas with other Students
Ayinde (1997) said that audio-visual aids aid communication among students that facilitate the exchange of ideas. Discussion helps the students to share their ideas with their peer group in order to solve the problems.

Improvement in Students Performance
Many audio-visual aids are handled by the students themselves so students' hesitation about their handling and manipulation become removed and students' performance will automatically be increased. Stephens (n.d) said that memory links are provided by visual aids i.e. images so information is retained in better way and for longer period of time that leads to better performance of students in classroom. Furthermore, the use of visual aids in teaching is an important recall mechanism.

Due to ever increasing worth of technology in instruction, it is desirable to take the views of students about its use and its effect on their learning and behavior.

4. RESEARCH METHODOLOGY

Sample

200 students (100 Girls and 100 Boys) were selected from five Government Secondary Schools. One section from science and arts of 9th and 10th classes respectively were randomly selected. Five high achievers and five low achievers from each section were selected on the basis of their previous result (Appendix A).

Instrument

A self-developed questionnaire based on three point Likert scale was administered to sample students. This questionnaire was validated by experts of psychology and education to check the appropriateness of items.

Data Analysis

Data was tabulated and analyzed by calculating frequency distribution (Appendix B), *t*-test (Paired Samples Test) and Product-Moment Correlation Method (Appendix C & D; & E respectively). Statistical Package for Social Sciences (SPSS, 17.0) was used for statistical analyses.

Means of girls and boys were compared and correlated by taking all variables separately (Appendix C & D). Means of different pairs were also correlated i.e. create positive interaction with quick learning, attentive and busy, creative work and positive impact of teaching and so on and so forth (Appendix E).

5. CONCLUSION

From the study it was concluded that behavior of the students can be modified with the help of appropriate and suitable instructional technology as they are the vehicles to create positive interaction between students and students and teachers and students, make the learning quick, keep the students attentive and busy in classroom, create positive impact of teaching, serve as a tool to make difficult concepts easier to understand, offer opportunities to exchange ideas with other students and improve the students performance. Boys and girls gave the same value to the use of audio-visual aids and their impact on students' mind, behavior and learning. Similarly all variables are correlated with one another and use of instructional technology effects on all aspects of behavior in positive way. The research findings were supported by Byk (n.d.), Lavin, Korte and Davies (n.d.), Lowerison, Scalter, Schmid and Abrami (2006), Roblyer (2003), Epper and Bates (2001), Patil (2010), Sheeshan (2011), Apperson, Laws and Scepansky (2006), Atkins-Sayre, Hopkins, Mohundro and Sayre (1998); Daniels (1999) and Mantei (2000), Alaku (1998), Ayinde (1997) and Stephens (n.d) etc. etc.

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Appendix A
Sample

Class	Group	High Achievers	Low Achievers	Total Number of Schools
9th	Science	5	5	
	Arts	5	5	
10th	Science	5	5	5
	Arts	5	5	
Total		20	20	40×5=200 (Total number of students)

Appendix B
Frequency Distribution

Variables	Girls			Boys			Total
	Agree	Disagree	To Some Extent	Agree	Disagree	To Some Extent	
Create Positive Interaction	80	6	14	80	7	13	100
Quick Learning	87	0	13	88	0	12	100
Attentive & Busy	91	3	6	91	4	5	100
Creative Work	79	6	15	79	6	15	100
Positive Impact of Teaching	74	5	21	75	5	20	100
Make Difficult Concepts Easier	87	1	12	87	1	12	100
Exchange Ideas	70	9	21	71	9	20	100
Improvement in Performance	80	8	12	81	8	11	100

Appendix C
Compare Means and Correlation between Variables
(Paired Sample t Test and Product-Moment Correlation)

Variables	Groups	N	$\bar{X}$	SD	t	r
Create Positive Interaction	Girls	100	2.66	.714	-1.000	.990
	Boys	100	2.67	.697		
Quick Learning	Girls	100	2.74	.676	-1.000	.955
	Boys	100	2.76	.653		
Attentive and Busy	Girls	100	2.85	.500	-1.000	.980
	Boys	100	2.86	.472		
Creative Work	Girls	100	2.66	.699	1.421	.982
	Boys	100	2.64	.732		
Positive Impact of Teaching	Girls	100	2.53	.822	-1.421	.985
	Boys	100	2.55	.809		
Make Difficult Concepts Easier	Girls	100	2.76	.638	1.000	.989
	Boys	100	2.75	.657		
Exchange Ideas	Girls	100	2.49	.823	-1.421	.985
	Boys	100	2.51	.810		
Improvement in Performance	Girls	100	2.68	.680	-1.421	.978
	Boys	100	2.70	.659		

df = 99   p > .05   Table value of t = 2.00
df = 99   p < .05   Table value of r = .2050

Appendix D
Compare Means between Girls and Boys
(Paired Sample t Test and Product-Moment Correlation)

Group	N	$\bar{X}$	SD	t	r
Girls	100	2.66	.714	-1.000	.990
Boys		2.67	.697		

df = 99   p > .05   Table value of t = 2.00
df = 99   p < .05   Table value of r = .2050

Appendix E
Correlation among Pairs (Product-Moment Correlation)

Pair	Correlation Variables	r
Pair I	Create Positive Interaction - Quick Learning	.896
	Create Positive Interaction - Attentive and Busy	.495
	Create Positive Interaction - Creative Work	.977
	Create Positive Interaction - Positive Impact of Teaching	.906
Pair II	Quick Learning - Attentive and Busy	.675
	Quick Learning - Creative Work	.386
	Quick Learning - Positive Impact of Teaching	.717
	Quick Learning - Make Difficult Concepts Easier	.989
Pair III	Positive Impact of Teaching - Make Difficult Concepts Easier	.726
	Positive Impact of Teaching - Exchange Ideas	.196
	Positive Impact of Teaching - Improvement in Performance	.883
	Positive Impact of Teaching - Attentive and Busy	.569
Pair IV	Improvement in Performance - Exchange Ideas	.859
	Improvement in Performance - Make Difficult Concepts Easier	.258
	Improvement in Performance - Attentive and Busy	.760
	Improvement in Performance - Creative Work	.955

df = 99   p < .05   Table value of r = .2050

SIZE-BIASED MOMENT EXPONENTIAL DISTRIBUTION

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ABSTRACT

In this paper, we discuss Size-biased Moment Exponential distribution along with its various properties and derive some reliability measures.

1. INTRODUCTION

Size biased distributions are special case of Moment (Weighted) distribution. The Moment distribution theory is applicable in observational studies of human, wildlife, forestry etc. where biased data arise. The hazard rate function has a pivotal role in analysis of actuarial sciences, reliability and survival analysis. A simple random sample cannot be taken from entire population in these areas of study. The concept of moment (weighted) distribution was first introduced by Fisher (1934) to model ascertainment bias and later Rao (1965) extended the basic idea of Fisher and introduced moment (weighted)

distributions of the type $g(x;\theta) = \dfrac{w(x) f(x;\theta)}{E[w(x)]}$, where $w(x)$ is a non-negative weight

function such that $E[w(x)]$ exists.

When $w(x) = x^m$ then such distributions are named as size-biased distributions of order m and are written as [Patil and Ord (1976); Patil (1981) and Mahfoud and Patil (1982)]:

$$g(x;\theta) = \frac{x^m f(x;\theta)}{\mu'_m} \qquad (1.1)$$

where $\mu'_m = \int x^m f(x;\theta)\, dx$ is the mth raw moment of $f(x;\theta)$.

When $m = 1$ or 2, these special cases are termed as length- biased or size-biased distribution and area-biased distribution, respectively.

The Exponential distribution is used to model waiting time between occurrences of rare events. In this paper

2. MOMENT EXPONENTIAL DISTRIBUTION

The probability density function (pdf) of one parameter Exponential Distribution is given by

$$f(x) = \frac{1}{\beta} \exp\left(-\frac{x}{\beta}\right), x > 0; \beta > 0$$

with mean β and variance β^2.

The probability density function of Moment Exponential Distribution is obtained by applying the weight $w(x) = x^m$ to (1.1).

$$g(x) = \frac{x^m \exp\left(-\frac{x}{\beta}\right)}{\beta^{1+m} \Gamma(1+m)}, x > 0; \beta > 0, m = 1 \ or \ 2 .$$

2.1 Size-Biased Moment Exponential Distribution

The size-biased moment Exponential distribution is obtained by taking $w(x) = x$,

$$g(x) = \frac{x \exp\left(-\frac{x}{\beta}\right)}{\beta^2}, x > 0; \beta > 0 .$$

2.1.1 Properties of Size-Biased Moment Exponential Distribution

The cumulative distribution function is

$$G(x) = 1 - \frac{(x+\beta) \exp\left(-\frac{x}{\beta}\right)}{\beta}$$

Arithmetic Mean	$\bar{X} = 2\beta$
Geometric Mean	$\hat{X} = 1 - \gamma + \log(\beta)$ $\gamma : EulerGamma$
Harmonic Mean	$\breve{X} = \dfrac{1}{\beta}$
Median	$\tilde{X} = -\beta - \beta \ Product \ Log\left[C[1], -\frac{1}{2e}\right]$ $Product \ Log : Lambert \ W \ function$
Mode	$\widehat{X} = \beta$
Variance	$V(x) = 2\beta^2$
Coefficient of Variation	$CV(x) = \dfrac{1}{\sqrt{2}}$
Entropy	$H(x) = 2 - Log\left[\dfrac{1}{\beta^2}\right]$

Moments

The rth moment about the origin is

$$\mu'_r = \frac{\beta^r \Gamma(2+r)}{\Gamma(2)}$$

For $r = 1, 2, 3, 4$, the first four moments about the origin are

$$\mu'_1 = 2\beta$$

$$\mu'_2 = 6\beta^2$$

$$\mu'_3 = 24\beta^3$$

$$\mu'_4 = 120\beta^4$$

The first four moments about mean are

$$\mu_1 = 0$$

$$\mu_2 = 2\beta^2$$

$$\mu_3 = 4\beta^3$$

$$\mu_4 = 24\beta^4$$

The Measure of Skewness is

$$\beta_1 = \sqrt{2}$$

The size-biased moment exponential distribution is skewed distribution.

The Measure of Kurtosis is

$$\beta_2 = 6$$

The size-biased moment exponential distribution is Lepto-Kurtic.

The Moment Generating Function is

$$M_{MX}(t) = \beta^{-2} \left(\tfrac{1}{\beta} - t \right)^{-2}$$

The Characteristic Function is

$$\varphi_{MX}(t) = \beta^{-2} \left(\tfrac{1}{\beta} - it \right)^{-2}.$$

2.1.2 Reliability Measures

The survival function is

$$S(x) = \frac{(x+\beta)\exp\left(-\frac{x}{\beta}\right)}{\beta}$$

The hazard rate function is

$$h_g(x) = \frac{x}{\beta(x+\beta)}$$

The hazard rate function of size-biased moment exponential, shown in Fig., is an increasing function.

The cumulative hazard rate function is

$$H_g(x) = \frac{x}{\beta} + \log(\beta) - \log(x+\beta)$$

The mean residual function is

$$e_g(x) = \frac{\beta(x+2\beta)}{x+\beta}$$

The reversed hazard rate is

$$r_g(x) = \frac{x\,exp\left(-\frac{x}{\beta}\right)}{\beta\left(\beta - (x+\beta)exp\left(-\frac{x}{\beta}\right)\right)}$$

The mean inactivity time is

$$m_g(x) = x - 2\beta - \frac{x^2}{x+\beta - exp\left(-\frac{x}{\beta}\right)}.$$
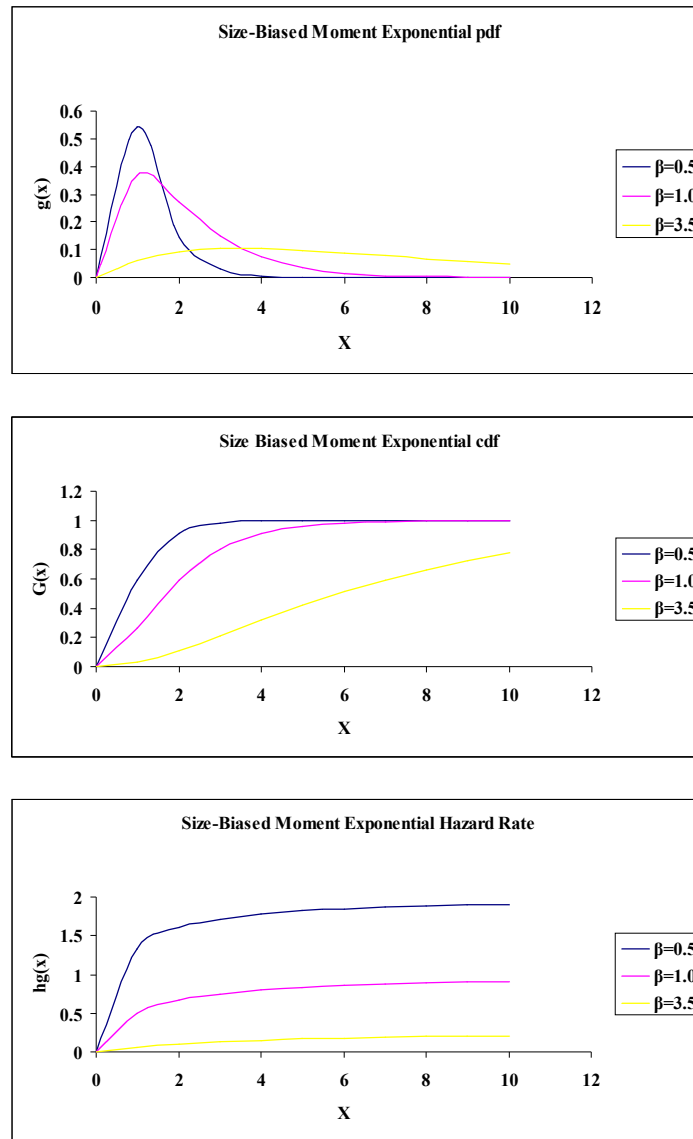
Fig. 1: Probability density function, Distribution Function and Hazard Rate function of Size-biased Moment Gamma Distribution

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EDUCATION PROCESS IN ISLAMIC WORLD

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ABSTRACT

As in Islamic world education is given especially formal in different institution. First the education is divided in Islamic world into religious and nonreligious. Both are on opposite extreme. One is called education for akhira and the other is called education for this world. And this is from when they loss the centralization. And the ummah is divided into more then fifty five countries. In this study an attempt will be made to analyze that how its happen. Also it will be studied that how the improvement is possible.

KEYWORDS

Process; Islamic world; Education; Akhira; Centralization.

1. INTRODUCTION

Theoretical Approach

The development & the education interface at the human capabilities. Education is a development of the human capabilities while development is an investment of the human capabilities. Moreover, the two processes of developing & investment of the human capabilities interchange support. The developing of the human capabilities would help maximize their investment while investment of the human capabilities would help augment their development. Hence, it is true to say that the education & the development interrelate not only closely & reciprocally but also, in some aspects or levels, conditionally. The realization of the development, in its comprehensive technical sense, is conditional on education while realization of education requires as condition development of the human capabilities. Nevertheless, the interchange of the support by the development & the education requires that they should be interconnected in a positive correlation & as much as this correlation is enhanced & optimized the mutual benefit between the development & education is maximized. However, the relation between the education & the development is not, as it would seem on first consideration, necessarily a positive relation or a direct correlation. A faulty education may not only fail to produce development but it may also hinder it. Similarly, a faulty or defective development may have negative impacts on education.

Since the development is a change for the better, education is not expected to be fully effective in enhancing the development process unless it becomes a tool of change for the better, in other words, becomes a developmental tool. Nevertheless, education is not always & necessarily developmental. It can be an advantage or disadvantage of the development depending on its aims, curricula & methods & only in presence of efficient

qualified teachers, efficient management, sufficient resources & proper environment not only inside but also outside the school & the house. For many reasons some or all of the said factors may fail to be advantageous enough to realize or enhance developmental education. Some of those reasons may be inevitable necessities or natural difficulties which are not man made though several of them may be unintended products of the man's deeds. Other reasons may be intentionally fabricated by some forces interested in hampering the developmental education for one purpose or other such as the desire to avoid the possible threat which the developmental education may pose, at least at the long term, to some of their interests or values.

As the development requires various numerous inputs & constituents, the education, though required as an essential condition, is not alone sufficient to bring into being & sustain a comprehensive development. Therefore, even if it could partially be developmental in a disadvantageous environment, the education will be of little or, perhaps, no ability or use to launch or sustain a comprehensive development in absence of other inputs & constituents.

Education & Development in Islamic World: Malfunctioning Relation

In reality, the development-education relation would always have some positive & other negative aspects. It, therefore, may be called positive or negative relation only relatively or comparatively. Considering that, it may be noted that while one of the two parties to this dialogue, namely Japan, maintains a positive education-development relation, the other party i.e. the Islamic world, seemingly with few exceptions, maintains a quite defective & malfunctioning education-development relation.

The defectiveness or malfunctioning of the education- development relation in the Islamic world is due to various local & external/ international reasons & factors the most important of which may summarized as follows:

Disadvantageous Environment

The defective / malfunctioning education-development relation in the Islamic world was largely caused by the prevailing local & international environment disadvantageous to both the development & the education in the Islamic world. This disadvantageous environment affects the education, development & their interrelation in the Islamic world in many aspects & ways. These–for instance only- include, from the local environment, the foreign investment discouraging setting & the imbalance between the population & economic growth rates as well as, from the international environment, the unfair international economic order & international interferences/interventions which not only impede but also, sometimes, ruin the developmental achievements & bring to halt the education process (Iraq may be considered as the latest example).

However, what here are more significant, for being more relative to the theme of this presentation, are the environment's negative effects on any of the development or education that, in turn, have negatives consequences on the other, in other words, the environment's negative effects on the education- development relation. From this perspective, it is evident that the environment in the Islamic world is partially responsible for the lower rate of the school age children joining the schools, high rate of

discontinuing the study & the students' moderate average rate of assimilation. It is not difficult to notice that these negative effects of the environment on the education have their adverse consequences on the development. Perhaps, the environment disadvantages most detrimental to the education & development in the Islamic world are the ones which result in distressing the willingness or impairing the abilities of the educationally qualified human resources to make quality scientific/developmental efforts or accomplishments. Some of those disadvantages, such as the development disadvantageous cultures & norms & development disadvantageous official policies & laws, impose, respectively, self-made moral limitations & external restrictions on the qualified human resources abilities/willingness to make developmental or scientific accomplishments at least in the same environment as of the Islamic world. Others, such as exhaustion of most of the resources & time in pursuit of the life necessities, distract many of the educationally qualified resources from the scientific creativity or great developmental accomplishments while others, such as the low remunerations, discourage the educational excellence & developmental distinction.

Such disadvantages, coupled with the attractive opportunities of pursuing academic or research work or joining lucrative jobs in the developed countries, led to extensive emigration of specially but not only the not many highly qualified human resources in the Islamic countries outside the Islamic world resulting in the so-called brain hemorrhage. Thus, the Islamic world looks as if it is employing or dedicating not only its education system / institutions but also a considerable amount of its meager financial resources to qualify & prepare human resources to meet not the Islamic world but, strangely enough, the developed mainly western countries' requirements of qualified human resources!.

In addition to the development disadvantageous environment, both the education & the development in the Islamic world experience some self faults or defects which further affect negatively their as well as their interrelation efficiency.

Defective Development

The development in the Islamic world experiences some self defects on the conceptual, planning & implementation levels. Among the conceptual or visional defects come the lack of enough clarity & the seemingly endless controversies over some contradicting main attitudes or approaches. Such controversies often go beyond peaceful exchange of views & counterviews, under appealing to the majority rule, to extent of implication of the involved parties in attempts to try to hinder the developmental efforts of each other in a manner that weakens the outcome of all the total developmental efforts. Two of the development concept relevant issues which commonly & almost unavoidably provoke in the Islamic world controversies detrimental to the development are the role of Islam & the stance on the Western development pattern over which the traditional views & ideas in the Islamic world are harmfully contradicting. The planning defects include lack of pan-Islamic integration, poor grass roots participation, & provincial imbalance. While the poor participation discourages the grass roots from actively undertaking its important role in implementing the development plans, the provincially imbalanced plans led in some Islamic countries to political disturbances or regional rebellions that hampered the whole process of development.

Substandard Education

Certainly, the education in various Islamic countries enjoys some varying scientific & developmental efficiency. This can be, if required, substantiated by many points & achievements including the remarkable scientific accomplishments made by some of the Islamic world graduates working in a better environment abroad & the varying standards of development particularly the relatively high standards achieved by some Islamic countries. Nevertheless, it is evident that the efficiency in the Islamic world is generally quite less than it should have been or compared to the education developmental efficiency achieved by the other party to this dialogue (Japan). The many educational reasons for the low scientific & developmental efficiency of the education in at least most of the Islamic countries include the lack of creative, innovative & student- centered approaches & methods of teaching; lack of proper correlation between the education plans & the development plans & proper linking of those plans to the society needs & local resources mobilization requirements; shortage in the practical demonstration & field study in teaching the professional disciplines & applied sciences, & the development discouraging contents (negative conceptions & ideas) of some subjects. The poor average performance of the teachers / professors, the high students: teacher ratios, limited total uptake of the educational institutions & the relatively high schooling cost (the last two resulting in keeping the illiteracy rate high) also contribute to the low efficiency of the education system in the Islamic world.

Consequently, it seems that the education in the Islamic world has not yet fully become a change tool. It, therefore, may not be easy to find fault with those who may have the feeling that perhaps the education is being misused, at least in some of the Islamic countries, to maintain or prolong a disadvantageous status quo & protect the interests of some dominant political / apolitical forces. Such feeling may be further augmented by the ongoing controversy over some educational issues such as the curricula & syllabi of the non-formal education, banning or allowing teaching of some subjects/ concepts &, though subtly, secularity or religiousness of the education which all are manifestations or symptoms of the local & international struggle for the education in the Islamic world.

Education & Development in Islamic World: The Reform

In view of the above, it is obvious that the present situation of the education, development & their interrelation in the Islamic world calls for urgent reform to the education system, development process, education-development relation as well as the overall environment in the Islamic world. Therefore, one can't but feel bound to support the present domestic & foreign calls for the reform notwithstanding the apprehensions that-firstly - these calls may not be more than mere another form or phase of the ongoing struggle for the education in the Islamic world or- secondly- that the prevailing political nature of the motives behind those calls may make the reform stops short of, or deviate away from, being, as should be, an objective & comprehensive reform.

It may be fair to hope that this forum shall contribute to enabling the Islamic world benefit from the Japanese successful pattern or experiment in respect of optimizing the education-development relation. The forum may, therefore, consider the convenience of

proposing / initiating some particular proceedings or an ad hoc body to facilitate sharing of experience in this extremely important field. [1]

2   PROPOSED APPROACH

The data will be gathered from different sources i.e University, Colleges, Schools Internet etc.

3   ANALYSIS AND RESULTS

The data were collected by different technique like Interview, Questionnaire and observations.

4   RESULTS

On the basis of the data it is clear that Islam is a very broad religion regarding education. As the messengers of God were the preachers of knowledge. Because Islam is the way for the living. So it is complete. Islam guide the human that how to live the life. In its Holy Books on one side its challenge the human that think in this universe if you have the power of thinking. Islam is not against any science education if its for the betterment of humanity. There is no division of Religious and non-religious education. A lot of literature on Quran and Science is present. In which the scholar made their efforts to prove that science is a derived discipline from the Holy Quran.

5   CONCLUSION

In this research an attempt has been made to show that if the Muslim world want to achieve its position back then its possible only by knowing true spirit of knowledge. Further its possible to make more research by making the analysis using different technique.

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EDUCATION SECTOR IN PAKISTAN A SURVEY

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ABSTRACT

As in Pakistan people get education formally in different institution. The standard of education for different people is different. Because education is divided on the basis of syllabus and also on the basis of medium one is called English medium and the other is called urdu medium. In this paper it will be studied that how its possible to minimize the distance.

KEYWORDS

Sector; Study; Minimize; Formal; Syllabus.

1. INTRODUCTION

Education in Pakistan is overseen by the government's Ministry of Education and the provincial governments, whereas the federal government mostly assists in curriculum development, accreditation and in the financing of research. The article 25-A of Constitution of Pakistan obligates the state to provide free and compulsory quality education to children of the age group 5 to 16 years. "The State shall provide free and compulsory education to all children of the age of five to sixteen years in such a manner as may be determined by law".[3]

The education system in Pakistan is generally divided into five levels: primary (grades one through five); middle (grades six through eight); high (grades nine and ten, leading to the Secondary School Certificate or SSC); intermediate (grades eleven and twelve, leading to a Higher Secondary (School) Certificate or HSC); and university programs leading to undergraduate and graduate degrees.[4]

The literacy rate ranges from 87% in Islamabad to 20% in the Kohlu District.[5] Between 2000—2004, Pakistanis in the age group 55–64 had a literacy rate of almost 30%, those aged between 45–54 had a literacy rate of nearly 40%, those between 25–34 had a literacy rate of 50%, and those aged 15–24 had a literacy rate of 60%.[6] Literacy rates vary regionally, particularly by sex. In tribal areas female literacy is 7.5%.[7] Moreover, English is fast spreading in Pakistan, with 18 million Pakistanis[8] (11% of the population)[8] having a command over the English language, which makes it the 3rd Largest English Speaking Nation[9] in the world and the 2nd largest in Asia.[8] On top of that, Pakistan produces about 445,000 university graduates and 10,000 computer science graduates per year.[10] Despite these statistics, Pakistan still has one of the highest illiteracy rates in the world[11] and the second largest out of school population (5.1 million children) after Nigeria.[12]

Primary education

Only 80% of Pakistani children finish primary school education.[13] The standard national system of education is mainly inspired from the British system. Pre-school education is designed for 3–5 years old and usually consists of three stages: Play Group, Nursery and Kindergarten (also called 'KG' or 'Prep'). After pre-school education, students go through junior school from grades 1 to 5. This is proceeded by middle school from grades 6 to 8. At middle school, single-sex education is usually preferred by the community but co-education is also common in urban cities. The curriculum is usually subject to the institution. The eight commonly examined disciplines are Urdu, English, mathematics, arts, science, social studies, Islamiyat and sometimes computer studies which is subject to availability of a computer laboratory. Some institutes also give instruction in foreign languages such as Turkish, Arabic, Persian, French and Chinese. The language of instruction depends on the nature of the institution itself, whether it is an English-medium school or an Urdu-medium school.

As of year 2009, Pakistan faces a net primary school attendance rate for both sexes of 66 per cent. A figure below estimated world average of 90 per cent.[14]

Pakistan's poor performance in the education sector is mainly caused by the low level of public investment. Public expenditure on education has been 2.2 percent of GNP in recent years, a marginal increase from 2 percent before 1984-85. In addition, the allocation of government funds is skewed towards higher education, allowing the upper income class to reap majority of the benefits of public subsidy on education. Lower education institutes such as primary schools suffer under such conditions as the lower income classes are unable to enjoy subsidies and quality education. As a result, Pakistan has one of the lowest rates of literacy in the world, and the lowest among countries of comparative resources and socio-economic situations.[15]

In Pakistan, the quality of education has a declining trend. Shortage of teachers and poorly equipped laboratories has resulted in the out-dated curriculum that has little relevance to present day needs.[15]

Causative factors include defective curricula, dual medium of instruction, poor quality of teachers, cheating in the examinations and overcrowded classrooms. However, efforts are on the way of moulding the curriculum to meet its national requirements.[15]

There is great difference in the rates of enrollment of boys, as compared to girls in Pakistan. According to UNESCO figures, primary school enrolment for girls stand at 60 per cent as compared to 84 per cent for boys. The secondary school enrolment rate stands at a lower rate of 32 per cent for females and 46 per cent males. Regular school attendance for female students is estimated at 41 per cent while that for male students is 50 per cent.[14]

Secondary education Secondary education in Pakistan begins from grade 9 and lasts for four years. After end of each of the four school years, students are required to pass a national examination administered by a regional Board of Intermediate and Secondary Education (or BISE).

Upon completion of grade 9, students are expected to take a standardised test in each of the first parts of their academic subjects. They again give these tests of the second

parts of the same courses at the end of grade 10. Upon successful completion of these two examinations, they are awarded a Secondary School Certificate (or SSC). This locally termed as 'matriculation certificate' or 'matric' for short. The curriculum usually includes a combination of eight courses including electives (such as Biology, Chemistry, Computing and Physics) as well as compulsory subjects (such as Mathematics, English, Urdu, Islamiyat and Pakistani Studies).

Students then enter an intermediate college and complete grades 11 and 12. Upon completion of each of the two grades, they again take standardised tests in their academic subjects. Upon successful completion of these examinations, students are awarded the Higher Secondary (School) Certificate (or HSC). This level of education is also called the FSc/FA or 'intermediate'. There are many streams students can choose for their 11 and 12 grades, such as pre-medical, pre-engineering, humanities (or social sciences) and commerce. Each stream consists of three electives and as well as three compulsory subjects of English, Urdu, Islamiyat (grade 11 only) and Pakistani Studies (grade 12 only).

Alternative qualifications in Pakistan are also available but are maintained by other examination boards instead BISE. Most common alternative is the General Certificate of Education (or GCE), where SSC and HSC are replaced by Ordinary Level (or O Level) and Advanced Level (or A Level) respectively. Other qualifications include IGCSE which replaces SSC. GCE O Level, IGCSE and GCE AS/A Level are managed by British examination boards of CIE of the Cambridge Assessment and/or Edexcel of the Pearson PLC. Generally, 8-10 courses are selected by students at GCE O Levels and 3-5 at GCE A Levels.

Advanced Placement (or AP) is an alternative option but much less common than GCE or IGCSE. This replaces the secondary school education as 'High School Education' instead. AP exams are monitored by a North American examination board, College Board and can only be given under supervision of centers which are registered with the College Board, unlike GCE O/AS/A Level and IGCSE which can also be given privately.There is another type of Education in Pakistan which called Technical education. currently three boards, Punjab Board of Technical Education, NWFP Board of Technical Education, and Sindh Board of Technical Education providing facilities of technical education. PBTE(Punjab Board of Technical Education) offering Matric tac. and D.A.E (Diploma of Associate Engineering) in different technologies like Civil, Architecture, Mechanical, Electrical, Electronics, Computer Sciences and many more technologies. This is consist of three years and combination of Physics, Chemistry, Islamic study, Pakistan Study and other more than 25 books related to there Technology. After matric and then three years diploma is equal to 12th grade, and diploma holder called Associate Engineer. Either they can join there respective field or can take admition in B-tech or BE in there related technology after D.A.E.

Tertiary Education

Rawalpindi Medical College
    The University of the Punjab, established 1882 in Lahore, is the oldest University of Pakistan. According to the OECD's 2009 Global Education Digest, 6.3% of Pakistanis

(8.9% of males and 3.5% of females) were university graduates as of 2007.[16] Pakistan plans to increase this figure to 10% by 2015 and subsequently to 15% by 2020.[17] There is also a great deal of variety between the different age cohorts. Less than 6% of those in the age cohort 55-64 have a degree, compared to 8% in the 45-54 age cohort, 11% in the 35-44 age cohort and 16% in the age cohort 25-34.[18]

GIK Institute from the Clock Tower

Quaid-i-Azam University entranceAfter earning their HSC, students may study in a professional college for Bachelor's degree courses such as engineering (B.Engg/BS Engg.), medicine (MBBS), dentistry (BDS), veterinary medicine (DVM), law (LLB), architecture (B.Arch), pharmacy (Pharm-D) and nursing (B.Nurs). These courses require four or five years of study. There are some councils and boards that will handle all the educational matters in these cases and they are known as the PMDC, Pakistan pharmacy council and Pakistan nursing council. Students can also attend a university for Bachelor of Arts (BA), Bachelor of Science (BSc), Bachelor of Commerce (BCom) or Bachelor of Business Administration (BBA) degree courses. These all are the courses that are done in Pakistan and are really common but these days doctor of pharmacy is also gaining much reputation. The pharmacy council of Pakistan is doing huge struggle to make the pharmacy education better.

There are two types of Bachelor courses in Pakistan: Pass or Honors. Pass degree requires two years of study and students normally read three optional subjects (such as Chemistry or Economics) in addition to almost equal number of compulsory subjects (such as English and Pakistan Studies). Honours degree requires three or four years of study, and students normally specialize in a chosen field of study, such as Biochemistry (BSc Hons. Biochemistry). It can be noted that Pass Bachelors is now slowly being phased out for Honours throughout the country

Quaternary education Most of Master's degree programs require 2 years education. Masters in Philosophy (M.Phil) is available in most of the subjects and can be undertaken after doing Masters. Doctor of Philosophy (PhD) education is also available in selected areas and is usually pursued after earning a M.Phil degree. Students pursuing M.Phil or PhD degrees must choose a specific field and a university that is doing research work in that field. M.Phill and PhD education in Pakistan requires minimum of 2 years of study

In Pakistan, gender discrimination with regards to education occurs amongst the poorest households but is non-existent amongst rich households.[12] Only 18% of Pakistani women have received 10 years or more of schooling.[12] Among other criticisms the Pakistani education system faces is the gender disparity in enrollment levels. However, in recent years some progress has been made in trying to fix this problem. In 1990-91, the female to male ratio (F/M ratio) of enrollment was 0.47 for primary level of education. It reached to 0.74 in 1999-2000, showing the F/M ratio has improved by 57.44% within the decade. For the middle level of education it was 0.42 in the start of decade and increased to 0.68 by the end of decade, so it has improved almost 62%. In both cases the gender disparity is decreased but relatively more rapidly at middle level.[19]

The gender disparity in enrollment at secondary level of education was 0.4 in 1990-91 and 0.67 in 1999-2000, showing that the disparity decreased by 67.5% in the decade. At the college level it was 0.50 in 1990-91 and reached 0.81 in 1999-2000, showing that the disparity decreased by 64%. The gender disparity has decreased comparatively rapidly at secondary school.[19]

However, the gender disparity is affected by the Taliban enforcement of a complete ban on female education in the Swat district, as reported in a January 21, 2009 issue of the Pakistan daily newspaper The News. Some 400 private schools enrolling 40,000 girls have been shut down. At least 10 girls' schools that tried to open after the January 15, 2009 deadline by the Taliban were blown up by the militants in the town of Mingora, the headquarters of the Swat district.[20] "More than 170 schools have been bombed or torched, along with other government-owned buildings."[20]

Abdus Salam was a Pakistani theoretical physicist and Nobel laureate in Physics for his work on the electroweak unification of the electromagnetic and weak forces. Salam, Sheldon Glashow and Steven Weinberg shared the 1979 Nobel prize for this discovery. Salam holds the distinction of being the first Pakistani to receive the prize in the sciences. Salam heavily contributed to the rise of Pakistani physics to the Physics community in the world.[21][22]

Education expenditure as percentage of GDPPublic expenditure on education lies on the fringes of 2 percent of GDP. However, the government recently approved the new national education policy, which stipulates that education expenditure will be increased to 7% of GDP,[23] an idea that was first suggested by the Punjab government.[24] Author of an article, which reviews the history of education spending in Pakistan since 1972, argues that this policy target raises a fundamental question: What extraordinary things are going to happen that would enable Pakistan to achieve within six years what it has been unable to lay a hand on in the past six decades? The policy document is blank on this question and does not discuss the assumptions that form the basis of this target. Calculations of the author show that during the past 37 years, the highest public expenditure on education was 2.80 percent of GDP in 1987-88. Public expenditure on education as a percentage of GDP was actually reduced in 16 years and maintained in 5 years between 1972–73 and 2008-09. Thus, out of total 37 years since 1972, public expenditure on education as a percentage of GDP either decreased or remained stagnant for 21 years. The author argues if linear trend were maintained since 1972, Pakistan could have touched 4 percent of GDP well before 2015. However, it is unlikely to happen because the levels of spending have had remained significantly unpredictable and unsteady in the past. Given this disappointing trajectory, increasing public expenditure on education to 7 percent of GDP would be nothing less than a miracle but it is not going to be of godly nature. Instead, it is going to be the one of political nature because it has to be "invented" by those who are at the helm of affairs. The author suggests that little success can be made unless Pakistan adopts an "unconventional" approach to education. That is to say, education sector should be treated as a special sector by immunizing budgetary allocations for it from fiscal stresses and political and economic instabilities. Allocations for education should not be affected by squeezed fiscal space or surge in military expenditure or debts. At the same time, there is a need to debate others options about how

Pakistan can "invent" the miracle of raising education expenditure to 7 percent of GDP by 2015.[25]

Universities world rankings: According to the Quality Standard World University Ranking 2010 there are two Pakistani universities among top 200 Technology Universities of the World. Eleven Pakistani other universities including Institute Of Space Technology (IST),Quaid-e-Azam University, National University of Science & Technology, University of Karachi, ranked among World Top 1000 Universities of world, according to World Ranking of Universities.[26]

6. COMMENTS AND CONCLUSION

Finally its become concluded that by making some rapid improvement such as a single medium of instruction and single syllabus its possible to bring the change.

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HOW TO INVOLVE STUDENTS IN LEARNING PROCESS

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ABSTRACT

As students is the key part of learning process. The whole system is deployed to make the process enhance. Because they will be the future of any nation. Hence in this research it will be studied that how it's possible to make the improvements.

KEYWORDS

Involve; Student; Learning; Future.

1. INTRODUCTION

What does it say that after eight, ten, or even thirteen years of formal schooling the majority of students cannot explain the process of education in that they participate in? Sound Out believes that every student should be able to verbalize what they are a part of when they come to school. For that reason we have developed the Meaningful Student Involvement Learning Process.

Details

This Learning Process is designed to maximize student learning while realizing their involvement potential throughout the educational system. Each of the following components of the Learning Process is neither a step nor an end in-and-of-itself; rather, each is an interlocking platform that can serve to ensure the meaningfulness of student involvement.

Starting in kindergarten and extending through twelfth grade, students should have the opportunity to expand their capacity to be meaningfully involved throughout education.

The following Learning Process represents a constructivist perspective, in the sense that it is essential for past student learning to be acknowledged in order to build upon and progress. Regardless of the grade a student experiences meaningful student involvement, their previous knowledge about education should be assessed and built upon.

Components in the Meaningful Student Involvement Learning Process

Learn about learning. Learning is no longer the mystery it once was. We now know that there are different learning styles, multiple learning supports and a variety of ways to demonstrate learning. In order to be meaningfully involved, students must understand those different aspects as well.

Learn about the educational system. The complexities of schools are not known to many adults. Theoretical and moral debates, funding streams and the rigors of student assessment are overwhelming to many administrators, as well as teachers and parents. However, in order for students to be meaningfully involved in schools, they must have at least a basic knowledge of what is being done to them and for them, if not with them.

Learn about education reform. There are many practical avenues for students to learn about formal and informal school improvement measures, particularly by becoming meaningfully involved within those activities. Sometimes there is no better avenue for understanding than through active engagement in the subject matter, and school improvement may be one of those areas.

Learn about student voice. While it seems intuitive to understand the voices that we are born with, unfortunately many students seems to lack that knowledge. Whether through submissive consumerism, oppressive social conditions or the internalization of popular conceptions of youth, many students today do not believe they have anything worth saying, or any action worth contributing towards making their schools better places for everyone involved. Even if a student does understand their voice, it is essential to expand that understanding and gain new abilities to be able to become meaningfully involved.

Learn about meaningful student involvement. While meaningful student involvement is not "rocket science", it does challenge many students. After so many years of being subjected to passive or cynical treatment, many students are leery or resistant towards substantive engagement in schools. Educating students about meaningful student involvement means increasing their capacity to participate by focusing on the skills and knowledge they need. Only in this way can they be effective partners, and fully realize the possibilities for education today and in the future.

When the Learning Process is complete, schools should use what the evolving capacities of their student body to re-inform the next process, as students in the cohort will certainly be able to become meaningfully involved in yet more expansive ways. This is the re-invigorating challenge of meaningful student involvement: As students are always evolving, so should schools. That should not equate the end of tradition; instead, it should mark the beginning of a transformation that never ends. That is what learning is all about.[1]

Student Participation: Learning About Active Learning

Students stay interested and learn more from class when teachers use many different techniques to involve them in the learning process. These range from very short and simple techniques, like telling a story about the material, to more involved activities like small student work groups doing collaborative learning projects. Because teaching effectively is as much a process as learning effectively, teachers who are new to the classroom situation often find it helpful first to use traditional learning activities that they have modified, and then to experiment with unconventional strategies once they have established a comfortable rapport with their students. As they establish a hierarchy of active learning strategies, teachers also find it useful to document and evaluate the

effectiveness of each activity. Asking students to critique activities places teachers in the role of facilitator rather than dictator.

Active learning strategies serve a two-fold purpose: they make the classroom a dynamic, ever changing environment in which students have a voice, and they allow students to view teachers as people who are flexible enough to take risks in the classroom. Remember that your willingness to take risks in the classroom increases the likelihood of your students doing the same.

While all teachers hope their students will be self-motivated, they soon realize that some need more extrinsic motivation than others. Even motivated students occasionally need their teachers to prompt them to complete learning tasks. Active learning strategies serve as useful educational tools only when all students participate all of the time. Even experienced teachers grapple with the problem of ensuring student participation in classroom activities. One way to combat the problem of students who do not involve themselves in classroom activities because they are introverted or uninterested is to state in the course syllabus a policy concerning participation. A concise statement that defines active learning and discusses how the teacher will evaluate the quality and consistency of participation can help students realize that student participation is an important course goal. However, simply stating that students are accountable for participation is not sufficient; teachers need to monitor their system of evaluation constantly and consistently. Most of the students who at first balk at class participation eventually will accept their role as active rather than passive learners.

In the book Active Learning: Creating Excitement in the Classroom, Bonwell and Eison define active learning as that which "involves students in doing things and thinking about the things they are doing." They list the following general characteristics of strategies that utilize active learning in the classroom:
- Students are involved in more than listening.
- Less emphasis is placed on transmitting information and more on developing student's skills.
- Students are involved in higher-order thinking (analysis, synthesis, evaluation).
- Students are engaged in activities (e.g., reading, discussing, writing).

COMMENTS AND CONCLUSION

In future some practical experiments may be performed to check the results practically and suggest ne ways.

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MODERN LEARNING METHODS FOR THE TEACHERS

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ABSTRACT

As it is known that teaching is a challenging job. Teacher teaches by different methods. In this study it will be studied that how to improve the teaching learning methods. Because if the teaching methods are improved then learning will become easier and the students will learn more from the teaching process.

KEYWORDS

Modern, Method, Teacher, Challenge, Learning

1. INTRODUCTION

A combination of the most modern teaching and learning methods A teaching method comprises the principles and methods used for instruction. Commonly used teaching methods may include class participation, demonstration, recitation, memorization, or combinations of these. The choice of teaching method or methods to be used depends largely on the information or skill that is being taught, and it may also be influenced by the aptitude and enthusiasm of the students.

2. METHOD OF INSTRUCTION

Explaining

Explaining, or lecturing, is the process of teaching by giving spoken explanations of the subject that is to be learned. Lecturing is often accompanied by visual aids to help students visualize an object or problem.

Demonstrating

Demonstrating is the process of teaching through examples or experiments. For example, a science teacher may teach an idea by performing an experiment for students. A demonstration may be used to prove a fact through a combination of visual evidence and associated reasoning.

Demonstrations are similar to written storytelling and examples in that they allow students to personally relate to the presented information. Memorization of a list of facts is a detached and impersonal experience, whereas the same information, conveyed through demonstration, becomes personally relatable. Demonstrations help to raise student interest and reinforce memory retention because they provide connections between facts and real-world applications of those facts. Lectures, on the other hand, are often geared more towards factual presentation than connective learning.

Collaborating

Collaboration allows students to actively participate in the learning process by talking with each other and listening to other points of view. Collaboration establishes a personal connection between students and the topic of study and it helps students think in a less personally biased way. Group projects and discussions are examples of this teaching method. Teachers may employ collaboration to assess student's abilities to work as a team, leadership skills, or presentation abilities.[1]

Collaborative discussions can take a variety of forms, such as fishbowl discussions. After some preparation and with clearly defined roles, a discussion may constitute most of a lesson, with the teacher only giving short feedback at the end or in the following lesson.

Learning by Teaching

In this teaching method, students assume the role of teacher and teach their peers. Students who teach others as a group or as individuals must study and understand a topic well enough to teach it to their peers. By having students participate in the teaching process, they gain self-confidence and strengthen their speaking and communication skills.

Evolution of Teaching Methods

Ancient Education

About 3000 BC, with the advent of writing, education became more conscious or self-reflecting, with specialized occupations such as scribe and astronomer requiring particular skills and knowledge. Philosophy in ancient Greece led to questions of educational method entering national discourse.

In his literary work The Republic, Plato described a system of instruction that he felt would lead to an ideal state. In his dialogues, Plato described the Socratic method, a form of inquiry and debate intended to stimulate critical thinking and illuminate ideas.

It has been the intent of many educators since, such as the Roman educator Quintilian, to find specific, interesting ways to encourage students to use their intelligence and to help them to learn.

Medieval Education

Comenius, in Bohemia, wanted all children to learn. Much later, Jean-Jacques Rousseau in his Emile, presented methodology to teach children the elements of science and other subjects. During Napoleonic warfare, the teaching methodology of Johann Heinrich Pestalozzi of Switzerland enabled refugee children, of a class believed to be unteachable[by whom?], to learn. He described this in his account of an educational experiment at Stanz.[citation needed] He felt the key to have children learn is for them to be loved.

19th Century - Compulsory Education

The Prussian education system was a system of mandatory education dating to the early 19th century. Parts of the Prussian education system have served as models for the education systems in a number of other countries, including Japan and the United States.

The Prussian model required classroom management skills to be incorporated into the teaching process.[2]

20th Century

Newer teaching methods may incorporate television, radio, computer, and other modern devices. Some educators [who?] believe that the use of technology, while facilitating learning to some degree, is not a substitute for educational methods that encourage critical thinking and a desire to learn. Inquiry learning is another modern teaching method

3. CONCLUSION AND FUTURE WORK

With the help of modern methods teaching process may become very effective. In future this work may be extended more

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DYNAMIC MODELS AND YIELD FORECASTING OF NON-SEASONAL VEGETABLES IN PAKISTAN

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ABSTRACT

Vegetables accumulate significant influence in agricultural output of Pakistan. Pakistan Agricultural Research Council (PARC) reported Onion, Garlic, Chilies and Potato have highest yields. The demand of these vegetables is increasing. However, according to PARC, the productivity level is not increasing so far. The trends and associated factors are theoretically communicated. Nevertheless, none of the research has been conducted on the same issue. This article reported the trends in Yield of these daily intake vegetables. Data were taken from Pakistan Demographic Survey books published by Federal Bureau of Statistics from 1979 to 2009. Models were built showing effect of time and related area on the yield of each vegetable stratified for each province. These models also delineated the outliers in the data. Forecasting for next 20 years were done using time series models. Minitab and ITSM were used for the analyses of data.

INTRODUCTION

Agriculture is the backbone of the Pakistan's economy. It contributes to the economic and social well-being of the nation through its impact on the GDP, employment and foreign exchange earnings (Iqbal et al., 2005).[1]

Agriculture is contributing 22 percent to the GDP and employing 44.8 percent of the total labor force. About 65.9 percent of the country's population living in rural areas is directly or indirectly linked with agriculture for its livelihood. Pakistan is blessed with a diverse climate, fertile land, and one of the best canal irrigation systems in the world. Large varieties of crops are cultivated throughout the year, including wheat, cotton, rice, sugarcane and many other vegetables, which account for 91 percent of the value-added in major crops. Minor crops including oil seeds, pulses, fruits and vegetables account for 12.3 percent of the value-added agriculture, which grew 1.6 percent in 2005-06 as against a growth rate of 3 percent last year.

Pakistan's diverse climatic condition provides an opportunity of growing vegetables and condiments including spices in all seasons around the year in all provinces. The vegetables are short duration crops, which can be grown even in small spaces. Improving vegetable productivity will put the prices of vegetables within the reach of urban and rural poor. In Pakistan, more than 36 varieties of vegetables are grown on large scale comprising potatoes, gourds, tomatoes, cucumbers, lady fingers, turnips, cabbages, Brinjal, cauliflowers etc. Condiments such as chilies, seeds of cumin, onions, besides dry spices are produced in large quantities in Pakistan and are exported abroad. These are popular for their freshness, taste and nutritious value. Vegetables represent a dynamic

segment of Pakistan's agriculture. During 2005-2006, the area under vegetables and condiments increased by 19.2% (i.e. 0.6 million hectares) which is 6.1% of the total cropped area, while production increased by 12.7%. 'Vegetables' are important protective food and highly beneficial for the maintenance of health and prevention of disease. They may be edible roots, stems, leaves, fruits and seeds. Each group contributes to diet in its own way. It is not the green vegetables only that are useful.

Qureshi et al. (1992) analyzed the relative contribution of area and yield to total production of wheat and maize in Pakistan and concluded that there was more than 100% increase in total wheat production that can be attributed to yield enhancement. (Iqbal et al., 2005)[1]

The vegetables selected in the report were Onion, Potato, Chili and Garlic. The main aim of selecting these vegetables is to highlight the tremendously increasing production and yield of the highly consumed vegetables in the day-to-day life.

There is an outrageous need to forecast area, yield and production of Onion, Potato, Chili and Garlic in Pakistan. Therefore, the objective of this paper is to determine future prospects of Onion, Potato, Chili and Garlic in the four provinces of the country using past trends. The objectives for this study were:

- ℘ To determine effect of time on yield and production for above define commodities.
- ℘ Specification of an appropriate ARMA (p, q) model and forecasting the data.
- ℘ To find out the outliers who have a role in the variation of the data and to overcome on these disturbing variations.

METHODOLOGY

The respective Time series data was collected from the federal bureau of statistics Pakistan for the year 1979 to 2009. Data includes variables like area (in hectares), production (in tons) and yield (in hectares) of Onion, Chilies, Garlic and Potatoes. The data of these vegetables belongs to the provinces of Pakistan (Sindh, Punjab, Baluchistan and Khyber Pakhtunkhwa).

The effect of imposing different numbers of unit roots on forecasting precision is observed using Univariate ARMA modeling (Gustavsson and Nordström, 2001).[2] With the help of preliminary conditions, the forecasts of the difference can be accumulated to make a forecast of the level of the series.

RESULTS

The production of onion in Punjab increases 2.34 tons each year and area per hectare the increment of onion's production is 4.45 tons. There was drastic decrease in the yield of onion in 2008 (Fig. 1a) with a production of only 261 tons. Residual analysis interpolated the value of 305 tons for the same. Though, forecasted graph showed gradual smooth increase within next 20 years.
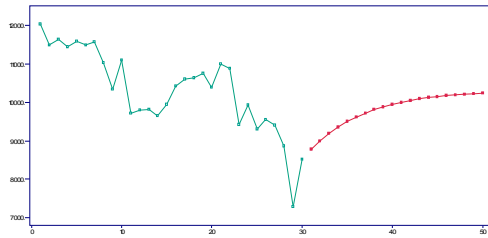
Fig.1a

Fig.2a

Similarly, the production of onion in Sindh increases 5.31 tons each year and area per hectare the raise of onion's production is 12.4 tons. There was a rapid increase in the yield of onion in 2000, 2001 and 2006 (Fig. 2a) with a production of 703, 738 and 833 tons respectively. The respective interpolated values were 616, 651 and 854 tons. Though, forecasted graph showed gradual smooth decrease within next 20 years.

The production of onion in Khyber Pakhtunkhwa decreases 2.33 tons each year and area per hectare the raise of onion's production is 25.2 tons. In Khyber Pakhtunkhwa, due to earthquake in 2008, the yield disturbed in a very bad way due to which the trend give unusual variation(Fig.3a) where the production of onion in Baluchistan increases 3.27 tons each year and area per hectare the increase of onion's production is 15.7 tons. There is random variation in the yield of onion which may be because of unstable political issues and law and order situations (Fig. 4a).
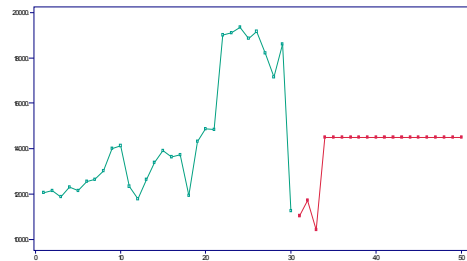
Fig. 3a
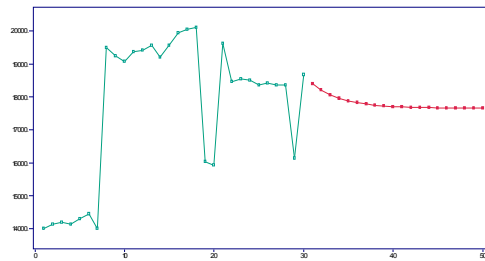
Fig. 4a

The production of Garlic in Punjab decreases 0.587 tons each year and area per hectare the increment of garlic's production is 15.2 tons. There was a rapid increase in the yield of Garlic in 1990 (Fig. 1b) with a production of 17 tons. Residual analysis interpolated the value of 13 tons for the same. Though, forecasted graph showed slightly smooth increase in next 20 years.

The production of garlic increases 7.16 tons per hectare in Sindh. Nevertheless, each year the production was decreased for a unit of 0.089 ton. There was an unusual drop off in the yield of garlic in 2001 (Fig. 2b). Though, forecasted graph showed gradual smooth an increase within next 20 years.
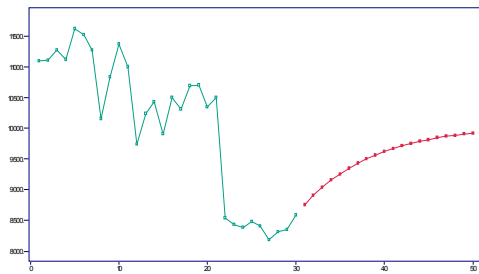
Fig. 1b
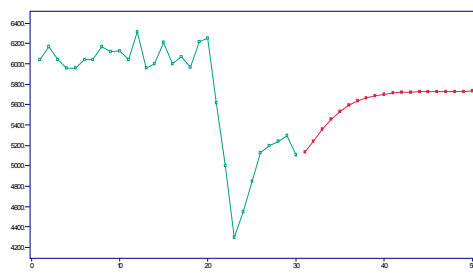
Fig. 2b

The production of garlic increases 0.276 tons per hectare in Sindh. Nevertheless, each year the production was decreased for a unit of 9.96 ton. Already mentioned above the situations in Khyber Pakhtunkhwa, earthquake in 2008, made an unforgettable disaster in the yield of garlic which the trend also giving unusual variation. There was a decrease in the yield of garlic (Fig.4b) with a production of 23.6 and 24.8 tons respectively. The respective interpolated values were 26 and 27.2 tons. Though, forecasted graph showed gradual smooth decrease within next 20 years. Where the production of garlic in Baluchistan slightly increases .0110 tons each year and area per hectare the increase of garlic's production is 7.14 tons. There is random variation in the yield of onion which may be because of unstable political issues and law and order situations (Fig. 4b).
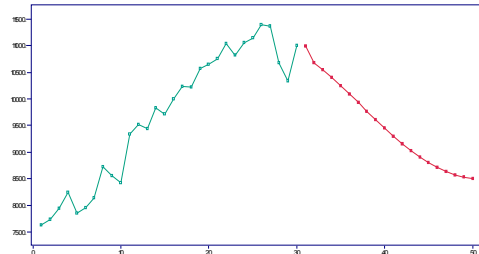
Fig. 3b
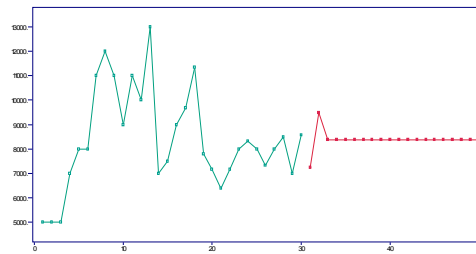
Fig. 4b

The production of chilies increases 1.49 tons per hectare in Punjab. Nevertheless, each year the production was decreased for a unit of 0.056 ton. There was a quick decrease in the yield of Chilies in 1983, then an increase both in 1984 and 2001 (Fig. 1c) with a production of 29.6, 34.5 and 18.6 tons respectively. Residual analysis interpolated the values 32, 36 and 17 tons respectively for the same. Though, forecasted graph showed a constant trend within next 20 years.

The production of Chilies in Sindh increases 1.04 ton each year and area per hectare the raise of chilies production is 1.44 tons. There was a decrease in the yield of Chilies in 1995 may be due to political issues in Sindh and increase rapidly in 2009 (Fig. 2c) with a production of 68 and 172.2 tons respectively. The respective interpolated values were 110.96 and 117.79 tons. Though, forecasted graph showed unusual constant trend within next 20 years.
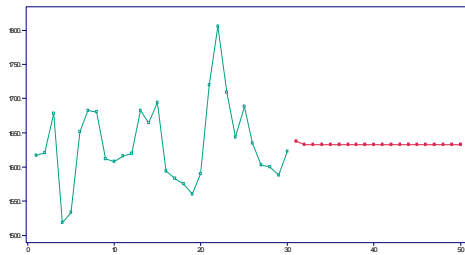
Fig. 1c
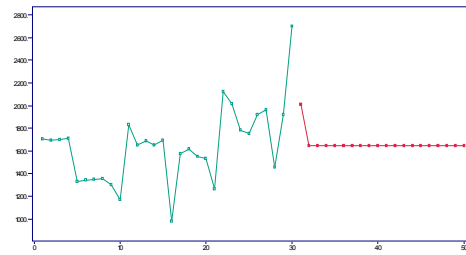
Fig. 2c

The production of Chilies in Khyber Pakhtunkhwa little increases 0.002 tons each year and area per hectare the raise of Chilies' production is 1.20tons. There was an increase in the yield of Chilies in 2007 (Fig. 2c) with a production of 0.8 tons. The respective interpolated value was 0.7 tons. Though, forecasted graph showed unusual and strange trend within next 20 years. In Baluchistan the production of chilies increases 1.60 tons per hectare .however, each year the production was decreased for a unit of 0.026 ton. There was a decrease in the yield of chilies in 2008 (Fig. 3c) with a production of 3.0 tons. The respective interpolated value was 6.09 tons. Though, forecasted graph showed gradual smooth increase within next 20 years.
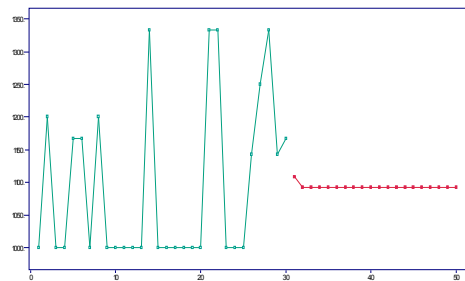
Fig. 3c
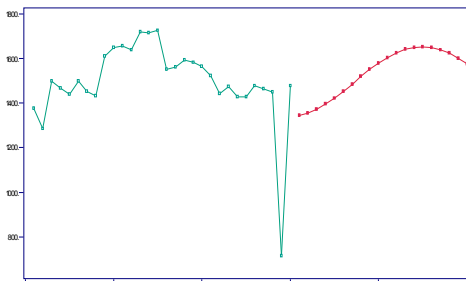
Fig. 4c

The production of Potatoes in Punjab surprisingly decreases 7.7 tons each year and area per hectare the increment of Potatoes' production is 24.4 tons. There was a quick increase in the yield of Potatoes in 2006, then a decrease in 1984 and again an increase in 2009 (Fig. 1d) with a production of 1390, 2388 and tons respectively. Residual analysis interpolated the values 1765, 2648 and 2430 tons respectively for the same. Though, forecasted graph showed a decreasing trend within next 20 years.
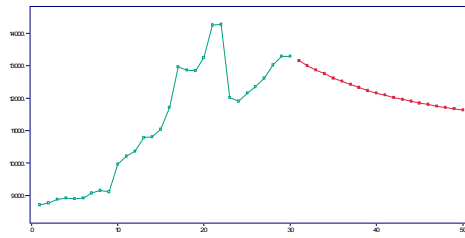
The production of Potatoes in Sindh increases 0.031 ton each year and area per hectare the raise of potatoes production is 10.3 tons. There was an increase in the yield of Potatoes in 1997 (Fig. 2c) with a production of 6.3 tons. The respective interpolated values were 5.36 tons. Though, forecasted graph showed unexpectedly increasing trend within next 20 years.
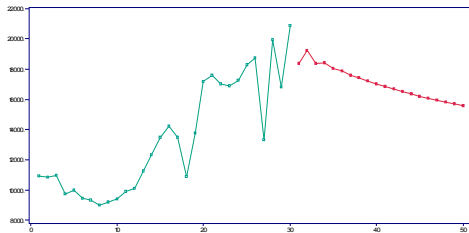
Fig. 1d
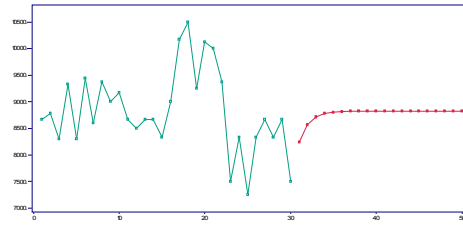
Fig. 2d

The production of Potatoes in Khyber Pakhtunkhwa increases 1.47 tons each year and area per hectare the raise of Potatoes' production is 11.7 tons. There was a decrease in the yield of Potatoes in 1991 and an increase (Fig. 3c) with a production of 78.9 and 133.7 tons. The respective interpolated value was 87 and 126 tons. Though, forecasted graph showed slightly decreasing trend within next 20 years. Where the production of Potatoes in Baluchistan slightly increases 0.567 tons each year and area per hectare the increase of Potatoes' production is 17.3 tons. There was a decrease in the yield of potatoes in 1988 and 2008 (Fig. 3d) with a production of 78.4 tons and 31.7. The respective interpolated values were 111 and 46.6 tons. Though, forecasted graph showed gradual decrease within next 20 years.
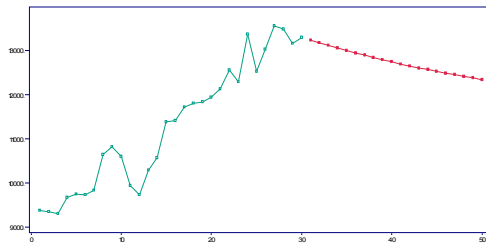
Fig. 3d
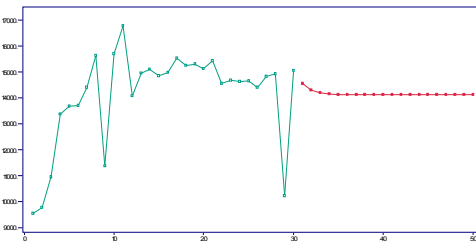
Fig. 4d

CONCLUSION AND COMMENTS

The main purpose of the study is to find out the facts due to which the non-seasonal vegetables yield is affected and to forecast the yield for coming 20 years for the betterment in the economy, production and yield of Pakistan. According to this study, the area of production and production itself is increasing day by day but the yield is not showing the same pattern. There are many reasons behind them. Pakistan continues to suffer from natural disasters, political issues, law and order situations and war against terror which are the main causes that affect the production and yield of non-seasonal vegetables(Sadia et al., 2012).

In the year 2008, the election was held after a long period. The time period of all this political establishment take from January to September due to which the yield of Onion in Punjab heavily disturbed and got in to loss. The same things were the reason of the fall of yield in Baluchistan in 1999 and 2008. But in coming 20 years the yield of onion of both provinces will increase in a sufficient manner. In Sindh, the yield of Onion was very

good and it was increase time by time in 2000, 2001 except 2006. This may be happened due to the appropriate climate and less corruption. But in 2006, it decreased suddenly which may be due to the corruption because the production was very good at that time. In 1998, the yield of onion in Khyber Pakhtunkhwa was virtuous due to the better law and order situation but in 2009, showed scarce fall which is definitely because of continued high terrorist attacks which made a great loss of man power in the aspect of deaths.

In 1990, the yield of garlic in Punjab increased may be due to well administration and good policies of Government at that time which played a positive role in the economy growth. The yield of garlic in Khyber Pakhtunkhwa both in the years 1989 and 2008 decreased which may be because of less water irrigation in the both years. In 1997, the yield of garlic in Baluchistan unexpectedly increased due to good governance and less corruption.

The production of chilies was good as well as yield showed a good pattern. There were not very unexpectedly changes in this yield but a little decrease both in years 1984 and 1985. But in 2001, it increased may be due to control in corruption.in 1995, the yield of chilies was suddenly dropped because of political issues but in 2009, the production and yield increased precipitously which may be due to a stable political environment and extra water usage by the flood in 2005.in Khyber Pakhtunkhwa the yield of chilies increased in 2007 but not much affected and in Baluchistan, the yield of chilies decreased which is because of some very dangerous political ups and downs in 2006.

In 2006 and 2008, the yield of potatoes in Punjab decreased. It was due to flood in 2005 which destroyed the fields of potatoes but fortunately Punjab government again made the yield on the boom in 2009 by taking the right decisions on right time. In 1997, the yield of potatoes increased a little due to the extra water stored by the flood in 1996. In Khyber Pakhtunkhwa, potatoes yield decreased but controlled ion 1992. Then in 2003, it increased because of extra water by the flood in the same year. In Baluchistan, the yield of potatoes falls drastically both in years 1988 and 2008. The main reason behind this down fall may be due to the political issues and continues terrorist attacks.

Actions must be taken against wastages of the production of these vegetables. Terrorism should also be controlled. At last, deaths occurred due to natural disasters and terrorist attacks affect the yield which affects the GDP in several ways, for example Deaths of earning hands of the family reduce the consumption level, government tax revenue, private savings and investments.

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THE IMPACT OF HIDDEN CURRICULUM ON THE ORAL AND COGNITIVE ABILITIES OF MIDDLE-SCHOOL STUDENTS OF LAHORE

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ABSTRACT

This paper presents a research study aimed at investigating the impact of hidden curriculum on the oral and cognitive abilities of middle-school students of Lahore. The organizational aspect of hidden curriculum has been selected for this research study. Although, there exist a number of elements of the organizational aspect of hidden curriculum, the emphasis of this research study is on extra-curricular activities and teaching strategies used by the teachers in classrooms while delivering the lessons. Fluency, pronunciation and vocabulary are the three features selected for assessing the oral abilities of students whereas logical reasoning, problem-solving and originality are the elements chosen for evaluating the cognitive abilities of students. Eclectic approach has been adopted to carry out this research study. Survey was conducted with 100 students of Grade 7 of three Private schools of Lahore. Quantitative research data was gathered with the aid of a questionnaire and a vocabulary test which was administered on the sampled population. Qualitative research data consisted of in-depth interviews and pronunciation tests of eighteen students. The results of this study reveal that participation in extra-curricular activities and teaching strategies utilized by the teachers together play a significant role in enhancing the oral and cognitive abilities of students. As such, a positive impact of hidden curriculum on the oral and cognitive abilities of middle school students has been established in this research study. However, the implementation of hidden curriculum can be made more effective by integrating it with formal curriculum as well as by re-considering the teaching strategies of teachers.

1. INTRODUCTION

Most of the parents and stakeholders of schools underestimate the significance of hidden curriculum. Therefore, this research study tends to determine the effect of hidden curriculum on the oral and cognitive abilities of middle-school students of Lahore. It is significant to conduct this research so that the importance and implementation of hidden curriculum will be highlighted to the people. Hidden curriculum is everything that students learn indirectly through activities, observations and experiences, which are not taught directly by some teacher.

2. THEORETICAL ORIENTATION

The term 'Hidden Curriculum' was first coined by a sociologist, Philip Jackson in 1968. Jackson stated that "what is taught in schools is more than the sum total of curriculum." He thought that schools should be understood as socialization process where

students can pick up messages through the experience of being in school, not only through direct messages but also by indirect messages.

Various points of view were put forth different researchers and each of them analyzed in the light of their own research studies. Therefore, **Durkheim in 1925** stated that "schools must focus on teaching students more than what is written in overt curriculum." **Elizabeth Vallace** was also one of these researchers, she acknowledged hidden curriculum as the "process approach" rather than a "product approach" in 1973. Similarly, **Samuel Bowl and Herbert Gintis** carried out their research on hidden curriculum three years later after Elizabeth Vallace in 1976. They analyzed that schools are not only in charge of making students read the established curriculum of textbooks but they are also responsible for developing their personalities and enhancing their cognitive abilities. Also, it assists the students in choosing an appropriate occupation for them.

There are two related aspects of hidden curriculum, the structural or organizational and the cultural one. In the current research study focus has been laid on the "Structural or Organizational aspect" of hidden curriculum. This aspect of hidden curriculum includes time scheduling of classes, materials provided by the schools such as textbooks and other work books, computer software, teaching strategies used by teachers in the classroom, speech therapies and extra-curricular activities that are conducted in the schools etc. On the other hand, the focus of cultural aspect is on school norms and ethos, rituals and celebrations, roles and relationships; the relationship between students with each other and the relationship between teachers and students. It also includes the relationship between students, belonging to different cultures and social backgrounds, which are referred to as intergroup relationships.

There are various researches which reveal positive results about the impact of extra-curricular activities on students. One of such evidences was found in a research study carried out by Ismat Ara and Rakhsi Saleem in Peshawar district, Pakistan. The perceptions of stake holders of schools and the impact of extra-curricular activities on students were particularly observed in this research study. The outcomes of this study highlighted that participating in co-curricular activities doesn't distract attention of students from their studies. Rather, it helps in increasing their knowledge and enhancing their skills which will eventually turn out to be helpful in making them better performers during their examination. This research study carries a great importance for the current research study as it gives researcher an idea about the previous researches that have already been conducted in different provinces of Pakistan. However, cultures and perceptions vary with each province of Pakistan.

The role of teachers and their teaching practices cannot be denied as well. Effective teachers employ a range of teaching strategies and styles. Effective instructors teach students such strategies that they can use to help themselves expand their knowledge of the language and their confidence in using it.

A research study conducted in United States of America by Guido Schwerdt and Amelie C. Wupperman (2008) attempted at shedding light on the constitutive elements of teaching quality by analyzing the relationship between teaching practice and student achievement. Two elements, i.e. the percentage of time that teachers spend in classroom while giving the lecture and the way he/she delivers the lecture were the points of

concern. However, problem-solving technique was considered to be the less important one. It is discovered that the performance of students is enhanced or gets affected by the way a teacher delivers lesson to the students. Moreover, to concentrate more on teaching strategies is positively correlated with students' higher achievement as well as with teachers' higher quality. This also makes clear the distinction between private and public sector schools in our society, as students of private sector schools are more confident and have sharp cognitive abilities as compared to the public sector schools where traditional methods of teaching are practiced in the classrooms.

3. METHODOLOGY

Focus of this study was particularly on the Private Schools of Lahore. Therefore, the data was collected from 7th Grade students of School A, School B and School C of Lahore. (Names not mentioned to maintain confidentiality). 27 students (15 female and 12 male students) from School A, 34 students (16 female and 17 male students) from School B, 39 female students of School C took part in this study. "Eclectic approach" was adopted for carrying out this research study in order to cover a large sample of respondents. Therefore, four data collection tools were integrated in this research study. Firstly, a well-structured questionnaire was used as one of the data collection tools, which consisted of both open-ended and close-ended questions. Moreover, a vocabulary test was also conducted in order to assess the vocabulary skills of students, which is the second data collection tool of this study. In addition, the qualitative data was collected through the interviews and the pronunciation tests, which were carried out with the students. It was an Applied Research. Probability sampling technique was used as convenient sampling technique to gather data from the respondents. The researcher decided to use this sampling technique because of the serious issues in regards to the permission from Private schools of Lahore for the data collection purposes.

4. RESULTS & DISCUSSION

It has been analyzed that 65% of the students took part in extra-curricular activities while 35% of them did not prefer participating in non-academic activities. The reason for most students not participating in extra-curricular activities was the excessive cost, which is charged by the school administration to take part in extra-curricular activities. Moreover, the unsuitable timings for extra-curricular activities restricted students from participating in extra-curricular activities and reserved them to their academic activities only. Some of the students adopted a direct approach during the interview session by showing unwillingness and uninterested behavior towards non-academic activities.

To assess the logical reasoning skills of students, they were first inquired about their eagerness for asking frequent questions from the teachers in order to comprehend the new concepts. It has been figured out that 80% of the students preferred asking as many questions as they wanted, until they understood the new concept. While 20% of them hesitated to pose any question in the class. It has also been examined from the analysis of interviews that the students who participated in extra-curricular activities felt more comfortable in making arguments. Moreover, they were competent enough to respond to any of the opposing questions asked by the researcher during the interview. Those students also managed to give reasons and solutions to certain pro

Do you participate in extra-curricular activities?
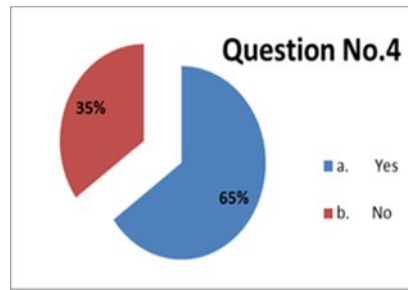
If a new concept is introduced in the class, do you ask frequent questions until it is not fully understood?
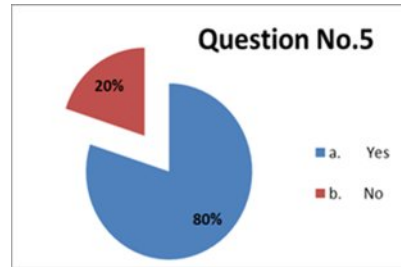
There is a significant relationship between participating in extra-curricular activities and its impact on making students to raise questions about their queries as well as to share their own perceptions and experiences. In the table given below, Pearson's chi-square value is the evidence of association between these two questions.

	Value	Asymp.Significance (2-sided)
Pearson Chi-square	46.492	.000
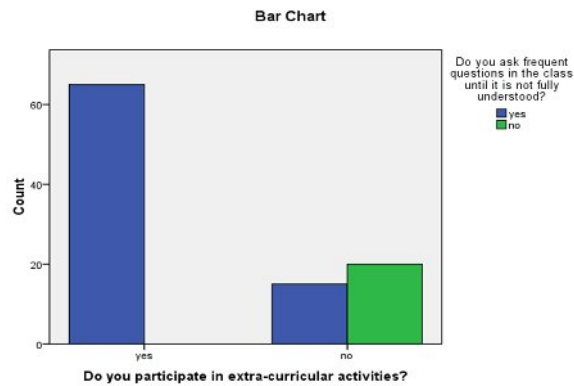
It has been analyzed that 68% of the students preferred searching more about a new concept while 32% of them did not show any interest. Moreover, whenever they came across a new word, they made discussions with their parents, siblings and class-fellows. 85% of the students showed their concern for discovering the outcomes of an activity or assignment before they started working on it whereas 15% of them gave negative responses in regards to this question. These questions were added in the questionnaire order to evaluate the problem-solving skills of students.

It has also been discovered that 81 % of the students agreed that their teachers conduct different activities in the class-room in order to capture their interest while 19 % of them totally disagreed with this question. Questions related to vocabulary were also incorporated in the questionnaire for the achievement of two purposes. Foremost, such questions were added in order to assess the vocabulary skills of students. Secondly, these questions were asked to analyze the impact of teaching strategies on students. Hence, 85% of students showed great interest for playing word games and positive results were acquired. Only, 15% of them did not like to play word games. This range of percentage included the students who didn't take part in extra-curricular activities. Majority of the students liked playing hangman, scrabble, crossword puzzles and word search, while a few of them liked to play "build word" game. It has been examined that the students who were fond of playing word games had sharper critical thinking skills and had good command over English vocabulary as compared to other students, who did not spend time in playing vocabulary games.

In addition, 42% of the students stated that their teachers prefer playing vocabulary games in the class-room while 58% of them responded negatively. It has also been figured out that only 15% of the students were habitual of reading newspaper on daily basis whereas 30% of the students preferred reading it twice a week, 24% of them read once a month and 14% of them did not show any interest for reading the newspaper. Furthermore, 75% of the students prefer to pick up difficult words from TV programs, radio, newspapers, textbooks and novel while the other 25% did not show any concern in regards to this question. However, an authentic proof about the deep connection between reading and enhancing vocabulary skills is observed through various research studies. One of such researches was conducted by Anderson & Freebody and Stanovich in 1992. This research highlights the significance of the connection between reading and writing skills. They concluded that "One of the best established relationships in the field of literacy is that between students' vocabulary knowledge and their reading comprehension." These researchers are of the view that this is not a simple cause-effect relationship, such that the teaching of many vocabulary words causes students to become better readers and writers, there should be some clear instructional recommendations for students. The teachers should better adopt an effective strategy to develop vocabulary for reading, for communicating orally, and for communicating through writing. The students who observed to play vocabulary, memory and word games in their free time, they were more proficient in vocabulary skills. This was also because of the reason that the teachers of such students emphasized on improving their writing skills along with the speaking skills.

It has been also scrutinized that 62% of the students agreed that their English teacher asked them to make connections between words and ideas and between words and pictures while delivering the lesson, while 38% of the students negated this statement. However, this is one of the best strategies that can be used by teachers in order to foster critical thinking of students when they need to think about the meanings of words, how these words are related and that how they can relate these words with new situations and new words with their own knowledge and experiences.

Results of questions to assess logical reasoning skills of the students showed that 75% of the students were successful in solving the query while the other 25% were unable to answer tricky question. Similarly, the students were given a statement with four options. The students had to choose the correct word, which did not fit the sentence. It is evaluated that only 48% of the students were able to give the correct answer whereas the other 55% of students were failed in solving this question. It has been explored that those students failed in solving this question who did not take part in the class discussions and extra-curricular activities. The cause of this inability was the lack of interest of students for solving their queries and discovering new concepts.

As far as the fluency in English speaking is concerned, 75% of students gave a positive response while 34% of them disagreed with this. It has also been analyzed that 66% of the students preferred speaking English language outside the formal class-room setup as well. They told that they also spoke English language at homes with their parents, siblings and cousins. A contradiction was observed in the responses of students, where 75% of students (including the students, who participate and the ones who do not participate in extra-curricular activities) stated that they were fluent in speaking English. However, the responses elicited through interviews revealed contrary to this result.

It has been examined that 75% of the students liked spending their time in creative writing activities while 25% of them were examined to be interested in other kind of activities. Two open-ended questions were included in the questionnaire with the purpose of assessing originality skills in students. The students were asked to share about the place they wanted to visit. They were also inquired about the things they wished to explore about that place. This question was incorporated for the purpose of assessing the creative skills of students. Majority of them gave very general answers; their responses were just limited to the first part of the question and they ignored the second part of it. On the other hand, it has been revealed that such students were not enthusiastic about exploring new things, so they lacked the skills of originality. Students who participate in class discussions and extra-curricular activities were found to be good explorers and innovators. Some of the students wanted to explore about different foods, cultures and religions of different countries. In addition, they wanted by their schools to arrange trips to different historical places and factories so that they will be able to explore different machines and their functions in manufacturing certain things. The students who participated in sports activities wished to go to hilly areas for hiking. It is observed that the male students, who participated in sports activities only, lacked the originality skill as they were not examined to be among the students who are capable of coming up with new ideas.

The second question, associated to the originality skills was designed to explore students' innovation and ideas, if they have to renew their bedrooms, what changes they would like to bring. It is observed that the students, who used to participate in art and craft competitions, were able to come up with more creative ideas to decorate their room. They wanted to bring different colorful paintings and flowery vases in their bed rooms. In addition, the students who preferred participating in creative writing, reading, and spelling bee competitions, wanted to have a study table and a library in their bedrooms.

Results of the vocabulary test show that the students (both male and female) who participated in extra-curricular activities and the ones who did not take part in such kind of activities, both obtained equal marks in the vocabulary test. It was not possible to make a clear distinction between their levels of perfection in the vocabulary test. The maximum marks that students obtained in this vocabulary test were 9 out of 10. It was interesting to observe that the highest marks obtained by one of the students, who didn't take part in extra-curricular activities. However, it has been observed that student read newspaper on daily basis as well as he preferred playing vocabulary games in his free time. It has been also examined that those students, who used to participate in debates and creative writing competition, they had poor vocabulary skills. One of the reasons behind this inefficiency is the lack of focus of teachers on the enhancement of vocabulary skills of students. Some of the students who participated in debates and creative writing competitions obtained 2 out of 10 marks, which were counted as the lowest marks of this vocabulary test.

An interview session has also been carried out with the middle-school students of Lahore. The interview questions were designed in a way which targeted the assessment of problem-solving abilities in students, their skills to come out with new ideas and to support their answers by giving different reasons. In addition, the fluency in speaking English was also one of the aspects to be considered in the interview session. The foremost aspect of analysis throws light on the distinction in confidence levels of students who took part in extra-curricular activities and the ones who did not show any concern regards to this. This distinction has been examined by the behaviors and interests of students towards the interviewer. Therefore, it has been found out that the students who contributed in class discussions and extra-curricular activities were extroverts in contrary to other students, who were examined to have introvert personalities. They were showing reluctant behaviors and were resisting taking part in the interview. Another dominant aspect was examined by the researcher that the students who participated in extra-curricular activities were able to communicate non-verbally in a better way as compared to the other ones. They were standing with self-reliance and were able to manage a constant eye-contact with the researcher. While the students who did not contribute in extra-curricular activities, they were looking down, rubbing their hands and were moving here and there.

The researcher also asked some contradictory questions from the students with the intension to analyze their logical-reasoning and problem-solving skills. It has been investigated that those students who used to take part in extra-curricular activities, they tried their best and managed to give relevant answers to questions by supporting them with different reasons. They also suggested possible solutions for the problems according to their awareness about the things. On the other hand, the students who didn't participate

in class discussions and extra-curricular activities, they became silent at once on asking an opposing question. They started thinking and finally ended up without giving any response or logical answer.

The assessment of pronunciation skills of students in English language was one of the aspects of this research study. Authoritative, bankrupt, catastrophe, controversial, downtrodden, gigantic, havoc, manipulates, potential and vicious were the words, selected for pronunciation test. It has been analyzed that the students who willingly take part and the ones who do not participate in class discussion and extra-curricular activities, both had poor pronunciation skills. There are two main reasons for this incompetency of students regards to pronunciation skills. First of all, there is lack of emphasis of teachers on improving the reading skills of students. Then, there is inefficiency of teachers for conducting activities in an appropriate manner. Hence, the teachers are failed in developing effective skills in students.

This research study reveals the significant facts about the impact of hidden curriculum on the oral and cognitive abilities of middle school students. It has been discovered that different kinds of extra-curricular activities leave varied impacts on students. Therefore, it is observed that the students who participate in debates, poetry and drama competitions, they have perfect logical reasoning skills but they are not good problem solvers. In addition, they are spontaneous and competent enough to give answers of opposing questions. On the other hand, the students who participate in Kangroo International Mathematic Contest (KI); they possess excellent problem-solving skills. They are more eager to discover about a new concept; they prefer to search on internet and like to play memory games on computers. Furthermore, the students who take part in art & craft, poster-making competitions and participate in annual drama, they are able to come up with more unusual creative ideas as compared to the other students. The students who participate in sports activities (football, cricket, basketball, karate, horse riding) only, they are neither good in cognitive abilities nor in oral abilities. A very few of them have sharp cognitive and oral abilities, who are the explorers and they prefer to participate in the discussions with their teachers, siblings and class-fellows. In addition, these students are not the fluent speakers of English language as well as they have poor vocabulary and pronunciation skills. On the other hand, there are some students as well who don't participate in extra-curricular activities because of transport and timings issues but such students prefer to make arguments and ask frequent questions from their teachers with the intention to comprehend the new concepts. Moreover, they also play word games in their free times at home. That is the reason, they have good problem-solving and logical reasoning, creativity and vocabulary skills but they are lack in oral abilities. As such students are not fluent in speaking English; they are imperfect in pronunciations as well. Also, they are quite unconfident; they hesitate and take long-pauses while speaking. The students who participate in Kirat competitions, they have good pronunciation skills as compared to other students. However, the students who don't take part in any of the extra-curricular activities, they are neither proficient in oral skills (vocabulary, fluency and pronunciations) nor good in logical reasoning, but some of them are creative and good problem-solvers.

It shall not be ignored that the teaching strategies have the same effect in the enhancement of oral and cognitive skills of students as the extra-curricular activities

have. It is the correct choice and successful implementation of teaching strategies being used by the teachers while delivering the lessons, which improves or worsens the skills of students. Overall, it is analyzed that the act of participation in extra-curricular activities plays a vital role in the development and nourishment of the oral and cognitive skills of students. Moreover, it also plays a great part in sharpening their originality, logical-reasoning and problem-solving skills.

5. SUGGESTIONS

It is highly recommended to the teachers not to cause the students to become passive learners, rather make them active learners. According to the strategy that these teachers practice with students, they make them the passive recipients of hidden curriculum messages, which do not allow for creativity and brain storming. The teachers should not make the students memorize the already written speeches and essays, which they have to read and write in debates and creative writing competitions. Because of these ineffective strategies, students have poor vocabulary and pronunciation skills, although they participate in debates, creative writing competitions, plays etc. The teachers should encourage them to write speeches themselves. For this, the teachers should practice the principles of "Bloom's Taxonomy." First, ask the students to search on the given topic and collect the relevant material themselves. Secondly, let the students understand and interpret it. Further, ask them to discuss the selected text with their teachers, parents, siblings and class-fellows and try to convert that in their own words.

The focus of the schools should be on improving all four skills of students, i.e. reading, writing, speaking and listening. It is observed from the analysis of data that teachers give priority to writing skills for middle school students of Lahore. However, there is inefficiency on the part of teachers for implementing activities and conducting lessons with the students. They are just teaching them at the surface level and making them passive learners. Reading skills are completely overlooked by the teachers. This is the main reason behind poor vocabulary of students, as there is a deep connection between skills of reading, writing, speaking, vocabulary, spellings and pronunciation. The emphasis should be given particularly on improving the vocabulary and pronunciation skills of students. It is observed from the analysis of questionnaires that the teachers do not conduct any of the vocabulary activities with students. Moreover, during the pronunciation test, a large number of students were unable to pronounce the words correctly. It is suggested that if teachers want to help students learn the meanings and contexts of words they must remember that "dependence on a single vocabulary instruction method will not result in optimal learning." Playing games with middle school students can make teachers to approach vocabulary from a new point of view and make the learning process active and enjoyable for students. In order to improve these skills, the habit of reading must be developed in students. For this, a library period should be allocated during the daily academic time table of students so that they can read books according to their interests. This activity would actually facilitate in developing reading habit in the students, which would ultimately help in improving the vocabulary and pronunciation skills of students. In this way, schools are trying to inculcate such skills in the students through hidden agendas by developing the habit of reading in students.

6. COMMENTS AND CONCLUSION

It has been examined that the vocabulary and pronunciation skills of students cannot be improved through their participation in extra-curricular activities. This is because of the reason that there is no appropriate and effective implementation of hidden curriculum in schools of Lahore. However, the schools have well-structured formal curriculums but it is suggested that formal curriculum should be integrated with the hidden curriculum. The sole purpose of extra-curricular activities is to enhance exposure among students about their surrounding and to stimulate their mental and physical state. Extra-curricular activities are going on in the schools but they are not benefiting the purpose of enhancing skills and developing personality of students. In addition, it is very important to make students as critical thinkers so that they are able to make informed choices in their lives. There are two shortcomings regarding to the failure of outcomes. Foremost, the method applied by the teachers is based on a superficial level. i.e. the students are not fully involved in the act and therefore the outcomes of the co-curricular activities are not productive. Second, the teachers have vague ideas about the activity itself which consequently leads to an unsatisfied result. I.e. the teachers are not well-aware of the objectives behind conducting a particular activity with the students.

Therefore, it has been concluded that the effective teaching strategies coupled with appropriate implementation of extra-curricular activities make the students better learners. On the whole, a "positive impact of hidden curriculum has been observed on the oral and cognitive abilities of middle-school students of Lahore." However, the process of learning can be made more effective for the students by following some of the significant practices. For this, it is suggested that hidden curriculums should be integrated with the formal curriculum of schools. Furthermore, teacher's training is also highly needed in this regard so that they should reflect and re-consider their teaching strategies in order to make the process of learning more effective for the students.

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BREAST CANCER INCIDENCE RATES IN KARACHI

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ABSTRACT

Recent studies are showing that the breast cancer incidence rates increased rapidly among women in Pakistan and it became first malignancy among females of Pakistan. Although, the incidence rates may contain important evidence for understanding and control of the disease. However, in Pakistan, the breast cancer incidence data have never been available in the last five decades since independence. Only hospital-based data are available.

In this study, we chose to work on the breast cancer incidence data of Karachi. We obtained the secondary data of breast cancer from various locations in Karachi. They include Jinnah Hospital, Karachi Institute of Radiotherapy and Nuclear Medicine (KIRAN) and CIVIL hospital, Karachi where the data are available for the most recent years 2004-2011. During this period, a total of 5331 new cases of female breast cancer were registered.

From 2004 to 2011, overall age-specific incidence rates (expressed as number of breast cancer per 100,000 women-years) were higher in 2008. However, they increased in ages 45 to 49, 60 to 64 and 70 & above ages and slightly decreased in ages 15 to 44, 50 to 59 and 65 to 69.

The patterns indicated that the incidence rates increased for women ages 45 and older women than younger. The higher proportion of older women diagnosed with breast cancer showed that women experienced delays in diagnosis and treatments. It shows that the availability of mammography screening for early detection of breast cancer will be particularly relevant for detection and prevention.

In spite of the possible of the data quality, the breast cancer patterns revealed by the CIVIL hospital and KIRAN provide valuable leads to cancer control in Karachi. Suitable methods of early detection and treatments are important to control and prevent an increase in the incidence of breast cancer.

KEYWORDS

Breast cancer, incidence, age pattern of incidence rates, hospital-based data.

1. INTRODUCTION

Pakistan, officially the Islamic Republic of Pakistan is an independent country of South Asia. Pakistan's estimated population in 2011 is over 187 million making it the world's sixth most-populous country. According to Global Cancer Statistics 2002,

Pakistan faces a double burden of cancer with a significant incidence and a rising trend in risk factors' profile itself like other developing countries of the region (Ferlay et al., 2004; Park et al., 2008).

In Pakistan, there are no comprehensive database/registries available regarding any disease including cancer and the only data available is hospital based. The Karachi Cancer Registry (KCR) was established in 1995. The registry was developed with the perspective of measuring the cancer burden through different areas or sample population of the country (Bhurgri et al., 2000).

Breast cancer disease is the most common malignancy causing deaths in women and also affecting both the developed and the developing nations. In Pakistan, breast cancer is one of the most dreadful diseases of women while the incidence of breast cancer is higher in Pakistani women than other countries of Asia (Afsar et al., 2010; Naeem et al., 2008).

Karachi, the largest city of Pakistan is divided into 5 districts, South, Central, West, East and Malir. The city has a population of 9,802,134; 5,261,712 males and 4,540,422 females (census 1998). The breast cancer incidence rates for the entire city of Karachi have never been calculated; however the relative frequencies of different cancers have been published individually by some radiotherapy centers (Hanif et al., 2010).

According to the 1995-1997 data, Karachi cancer registry (KCR) reports the most common malignancies in terms of age-standardized rates in females were breast, oral cavity and ovary. The cancers in males were lung, oral cavity and larynx. Accordingly, the data 1998 to 2002 showed a rising incidence for breast, esophagus and cervix in females and lung, larynx and urinary bladder in males (Bhurgri et al., 2006).

In Karachi Institute of Radiotherapy and Nuclear Medicine (KIRAN), also the most frequent malignancy recorded in females is breast and in males are head and neck cancers, which are 32.62% of the total male cancers. Similarly breast cancer is the most frequent cancer reported in females which is 15.12% (Hanif et al., 2010).

We are presenting hospital -based data on breast cancer incidence to determine relative frequencies and to examine recent trends in age-specific patterns of breast cancer incidence, we analyzed breast cancer incidence data from 2004 through 2011, the most recent year for which national breast cancer incidence data were available at the time of study.

2. MATERIALS AND METHODS

We chose to work on the breast cancer incidence data of Karachi. We obtained the secondary data of breast cancer from various locations in Karachi. They include Jinnah Hospital, Karachi Institute of Radiotherapy and Nuclear Medicine (KIRAN) and CIVIL hospital, Karachi where the data are available for the most recent years 2004-2011. Although this is a hospital based data having some constraints and biases but it is the major source, which can provide essential clinical, administrative and educational information on breast cancer incidence and allow better estimates of national pattern in the absence of any population based cancer registry in the country.

During this period, a total of 5331 new cases of female breast cancer were registered. We analyzed the data in 5-year age groups: 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75+.

Breast cancer incidence rates were calculated during 2004-2011, the annual population at risk for female and 5-year age groups were estimated based on the 1998 census (obtained from the Sindh Bureau of Statistics) by using Interpolating Splines and Auto-arima forecast function.

Breast cancer incidence patterns were observed annually by plotting incidence rates as a function of age. For each year, we plotted incidence-age curves to see the association between age and breast cancer incidence rates.

3. RESULTS

Figure 1 displays the observed breast cancer incidence rates by age group for the Karachi women (per 100,000 women) from 2004-2011.

The graph shows that breast cancer incidence rates remained relatively stable for women 15-25 years of age (fewer than 25 year age) and only showing slightly increase between years 2007 to 2008.

For all the age groups had relatively high incidence rates in year 2008, the rates first increased from 2007-2008 and subsequently declined in the 2009. Except women aged 60-64 years, there was an sharp increase in incidence between 2009 and 2010 for all age groups, for women age 60-64 year the incidence rates started to decline after year 2009.

For age group 30-34, the incidence trends slightly increased between 2004 and 2006 but declined thereafter, followed by a stable rates over the last year. Incidence trends for women aged 70-74 years and +75 years fluctuated during the study period, after year 2009 the rates sharply increased for women aged 70-74 years and +75 years. For women aged 75 years and above, the rates started to decline over 2004, then there was a clear and sharp increasing trend between 2005 and 2011. However, the incidence rates for women aged 75 years and above were stable during years 2007 to 2009.

In general, the incidence increased with age, and in each year, highest incidence occurred in women aged 50-54 years. The rates were stable at starting years, then increased to reach maximum incidence from 2006 to 2008, followed by a decline until 2011.
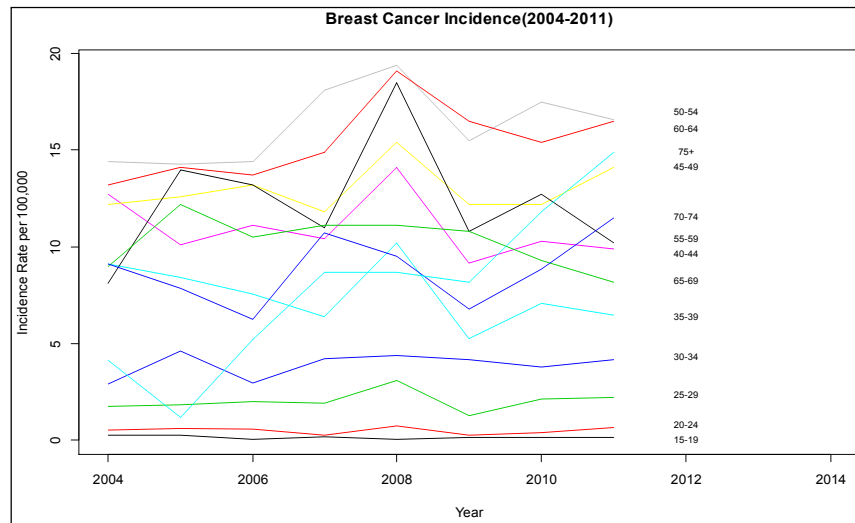
Fig. 1: Breast cancer incidence rates (per 100,000 women) by age-group (2004-2011)

Figure 2 shows the observed log incidence rates as functional data time series using rainbow plots. The curves are ordered in time using rainbow colors. The oldest data from 2004 are shown in red color with the most recent data from 2011 shown in purple.

By the graph we can see that the incidence rates increased with age. From early ages (>15) overall incidence rates were showing slightly increasing trends through age of 50 and the rates show variability for the age > 50. At early years from 2004 to 2005 the incidence rates at high ages (+70) started decline sharply and in recent years, the incidence rates were showing increasing patterns at high ages (70 and above).
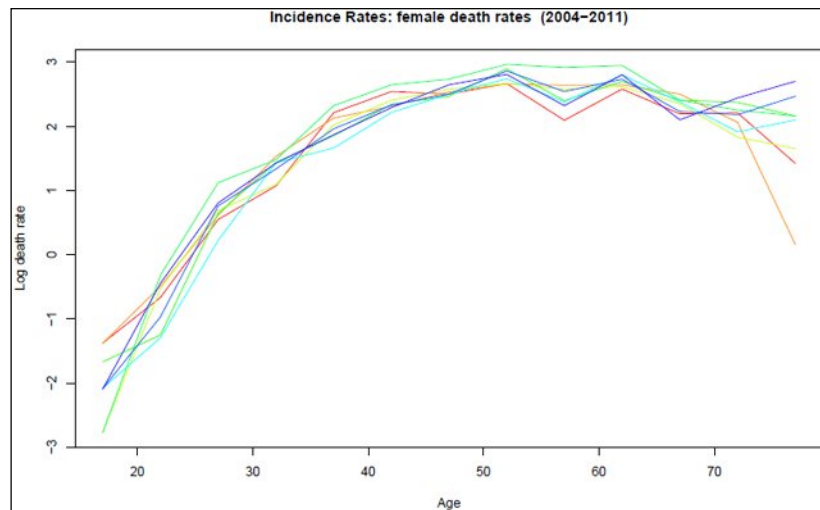
Fig. 2: Log incidence rates for Karachi women (2004-2011) by using Rainbow Plot.

4. DISCUSSION

According to Dr Jo Anne Zujewski, a visiting expert from the US National Cancer Institute," While fewer women in Pakistan are diagnosed with breast cancer compared to countries such as the US, Pakistan still has the highest number of women dying of the condition in the world"

Breast cancer is the most common cancer among women in the United States after the skin cancer, and overall after the lung cancer, it is the second leading cause of cancer deaths (Yasmeen et al., 2010). Breast cancer is becoming a serious health matter in many Asian countries and it also has become the leading cause of women death in Asia (Parkin et al., 1993).

Table: 1. Age-Specific Breast Cancer Incidence Rates in Karachi (2004 - 2011)

Age Groups	2004	2005	2006	2007	2008	2009	2010	2011	Total	%
15 - 19	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.1	19	0.4
20 - 24	0.5	0.6	0.6	0.3	0.7	0.3	0.4	0.6	70	1.3
25 - 29	1.7	1.9	2.0	1.9	3.1	1.2	2.1	2.2	219	4.1
30 - 34	2.9	4.6	3.0	4.2	4.4	4.2	3.8	4.2	380	7.1
35 - 39	9.1	8.4	7.5	6.4	10.2	5.3	7.1	6.5	664	12.5
40 - 44	12.7	10.1	11.1	10.4	14.1	9.2	10.3	9.9	839	15.7
45 - 49	12.2	12.6	13.2	11.8	15.4	12.2	12.2	14.1	787	14.8
50 - 54	14.4	14.3	14.4	18.1	19.4	15.5	17.5	16.6	782	14.7
55 - 59	8.1	14.0	13.2	11.0	18.5	10.8	12.7	10.2	534	10.0
60 - 64	13.2	14.1	13.7	14.9	19.1	16.5	15.4	16.5	507	9.5
65 - 69	9.0	12.2	10.5	11.1	11.1	10.8	9.3	8.2	254	4.8
70 - 74	9.1	7.9	6.2	10.7	9.5	6.8	8.9	11.5	169	3.2
75 & above	4.2	1.2	5.2	8.7	8.7	8.1	11.8	14.9	107	2.0
Total	97	102	101	110	134	101	112	116	5331	100

A total of 5331 breast cancer women patients were registered during the period 1 January 2004 to 31 December 2011, the incidence rates are displayed in Table 1. The most common age group which observed of 40-44 years with 839 cases (15.7%),followed by 45-55 years aged women the breast cancer incidence was seen in 14.8% .For younger ages 15 to 30 the incidence rates of breast cancers were at low percentages (15-19 years with 0.4%, 20-24 years with 1.3% and 25-29 years with 4.1%).

Overall, 15.7% of incidence cases are among 40-44 years of aged women, 14.8% are among 45-55 years, 12.5% are among 35-39 years and 10% are among 55-59 years of aged women and there were also low percentages at higher ages, 70-74 years aged women were at 3.2% and 75 and above aged women included 2% of breast cancer incidence. (Table: 1)

Like other developing countries, Pakistan also faces a double burden of cancer with a significant incidence of breast cancer in women (Gilani et al., 2006). In this study we have also analyzed the patients of both genders of all cancer types to determine frequencies of different cancers presented to Karachi division to the period of years 2009

to 2012. During this period, a total of 6621 all type cancer patients were diagnosed at Jinnah Hospital, Karachi for both genders.

We have presented here the most frequent malignancies among male and female. In males the five most common cancers were Oral Cavity (14.2%), Lung (9.5%), Liver (6%), Colon & Rectum (4.5%) and Larynx (4%). (Figure 03). In females, the breast cancer was the most common cancer accounting for 31% followed by Oral Cavity (15%), Esophagus (5%), Cervix (4%) and Ovarian (3.6%) respectively. (Figure 04)
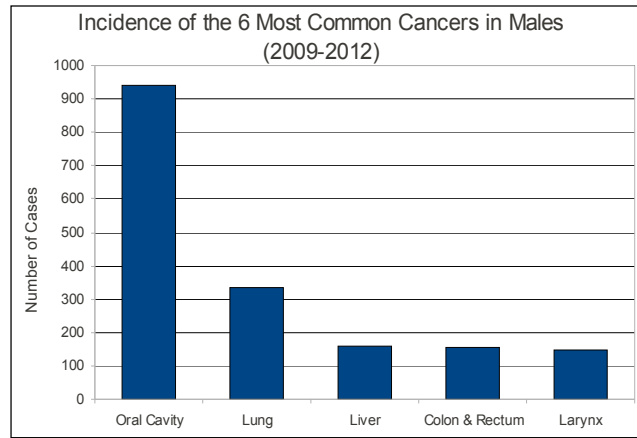
Fig. 3: The most common cancers in Males during 2009-2012
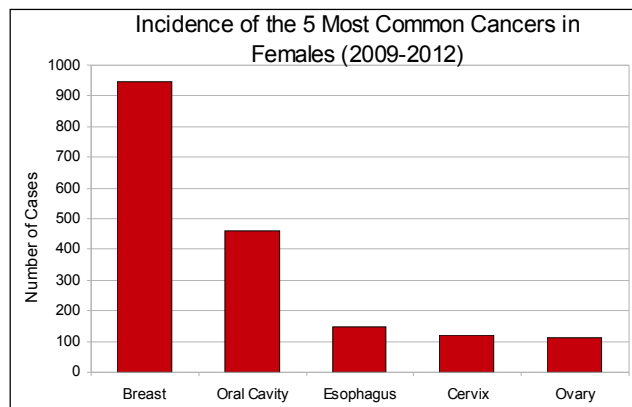
Fig. 4: The most common cancers in Females during 2009-2012

According to Karachi Cancer Registry (KCR) study in the 1995-1997 data, the most common cancers in terms of age-standardized incidence rates in males were lung (12.6%), oral cavity (10%), larynx (5.8%) and urinary bladder (5.6%). Respectively the frequent cancers in females were breast (33.1%), oral cavity (8%), ovary (6.5%) and cervix (3.5%) (Burghri et al., 2000). Another study from the data 1998 to 2002 showed a rising incidence trends for lung (10.6%), oral cavity (9.4%), larynx (5%) and urinary

bladder (4.5%) in males and in females, breast (32%), oral cavity (7.5%) , ovary (3.8%) and cervix (3.7%) showed high incidence trends (Bhurgri et al., 2006).

Comparatively in another study, Hanif et al.(2010) reported the most common malignancy in male were head & neck (32.62%), lung (15%), gastrointestinal tract(GIT) (6.9%), lymphoma (6.1%), in females breast cancer was the most common malignancy accounted 38.2% followed by head & neck (15.1%), cervical (5.5%) and ovarian (4.9%) respectively. In females, breast cancer was also reported with higher percentage in KCR and according to some other previous studies it is the highest incidence reported from any Asian country, except Jews in Israel (Bhurgri et al., 2006; Naeem et al. 2008).

Breast cancer remains the leading malignancy amongst females in Karachi. The incidence rates are moderately high, accounting for one third of cancers in females. Particularly, a progressive increase in the incidence rates of oral cavity has been observed in both genders, more apparent in males. Now it is leading malignancy amongst male followed by the lung cancer. The reason for this gradually increase is the increasing use of tobacco chewing and smoking. A survey in Karachi also reported that 36% of the males and 21% females chew pan with tobacco, so it is an apparent reason for this exponential increase in Karachi (Bhurgri et al., 2006).

Pakistan shows an unusually high incidence of a disease that was largely seen as one of the affluent in the West. Comparing Pakistan to India, one in every 22 women in India is likely to develop breast cancer, the risks amounts to one in every nine women for Pakistan (Park et al., 2008).

Local estimates also showed that Pakistan sees almost 90,000 cases of breast cancer, resulting in almost 40,000 deaths per year. This rate of mortality is as high as the US that has the highest rate of cancer patients in the world. Most breast cancer cases in Pakistan are detected at stages III and IV. After these advanced stages, the cancer can reach the bones, neck, lymph nodes, arms, liver and lungs (Kumar et al., 2009).

Therefore, it is important to focus on prevention and diagnoses rather than cure since early diagnosis in breast cancer increases chances of survival to more than 90 per cent (Sohail et al., 2007).

Most developed countries have national screening programs for early detection and cancer registries, which collect data for research and treatment of cancer patients. Unfortunately, in Pakistan there is still a dire need for the authorities to set up similar prevention schemes that can save women from this silent killer. According to experts, one of the most effective ways to educate women in rural areas about the disease and help them with self-examination is through lady heath visitors.

In conclusion, the breast cancer patterns and incidence rates reported in our study provide the valuable leads to cancer control in Pakistan and for the Karachi population too. Like other studies, there are few limitations, including fact that we had conducted the study on hospital-based data. However in the absence of population based registries, where standardized incidences and mortality figures are not available on national level, this will be provide useful information for controlling the overall burden of cancer in Pakistan and also utilized for health planning in future research.

5. ACKNOWLEDGEMENT

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DO WAIST AND HIP CIRCUMFERENCE ESTIMATE
BODY MASS INDEX CORRECTLY?

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ABSTRACT

Background: Body Mass Index (BMI) is one of the most common diagnostic instruments used to determine underweight, overweight and obesity. It depends on height and weight and is calculated by dividing weight (in kg) by square of height (in meter). Few studies have shown that there are relationships of BMI with waist and hip measurements and BMI can be estimated using these anthropometric measures. The **Objective** of the study was to determine whether waist and hip measurements can be used to estimate the BMI correctly. **Methodology**: Authors have used two different set of data, one from Pakistan and one from Saudi Arabia. The Pakistani data were obtained from Indus Hospital Community Cohort (IHCC) and Saudi Arabia data were obtained from a country wide survey for assessing the risk factor of Coronary Artery Diseases (CAD). The sample size of IHCC and CAD data were 427 and 14,343 respectively. Pearson, partial and interclass correlations were used for relationship and linear regression was used to estimate the BMI for both the genders and total sample. Different other statistics were employed to check normality of data and comparing the results between genders. **Results**: For IHCC data the partial, pearson and interclass correlation of BMI with waist and hip measurements were very high ranged from 0.802 to 0.942. Regression coefficients were highly significant and R^2 value was 0.793. For CAD data, the Pearson, partial and interclass correlations were ranged from 0.612 to 0.839. The regression coefficients were highly significant with R^2 value of 0.595. Nevertheless, the errors between expected and observed BMI were not very small. The error within ± 1 value was 30% for IHCC data and was only 19% for CAD data. **Conclusion**: The results showed that the estimation of BMI with waist and hip measurements using linear regression should be inferred with caution.

INTRODUCTION

Anthropometric measurements are the most important technique use to determine the health related risk factors. It includes height, weight, waist circumference and waist-to-hip ratio. BMI- a statistical tool is one of the most common diagnostic instruments used to determine underweight, overweight and obesity. BMI is of core importance to not only medical, health and fitness professionals but also to individuals in a way to monitor and classify their health status. BMI has been shown in studies to be a useful measure in predicting cardiovascular risk as well as other non-communicable diseases like diabetes.

BMI depends on height and weight of a person and is calculated by dividing weight (in kg) by square of height (in meter). Growth chart the corner stone of pediatric care are also constructed using these anthropometric measurements. Height and weight yet are the only anthropometric measurements that are highly utilized in health sciences and their inaccurate measurement can lead to false results. However, the accurate measurement of both these measurements is important and often difficult to measure and subject to considerable inter-observer variation. Furthermore, BMI cannot differentiate between lean body mass and fat mass. BMI does not actually measure the body fat and excess muscles; however it has been used as a proxy for estimating human body fat consequently; a fit person with a high amount of muscle tissue might weigh more than the individuals of similar age and height can be classified as being overweight or obese[1]. Accordingly, BMI should ideally be used in combination with other body composition assessments[1].

A 2010 study by Ghias et al. in Lahore, Pakistan showed that estimation of BMI using a prediction model based on waist and hip circumference is an alternate for type 2 diabetes patients. A 2006 study by Kamadjeu R.M et al. in Cameroon evaluated age-adjusted partial correlation between various anthropometric measurements and found that waist circumference and hip circumference are significantly associated BMI in both men and women. It has been reported that waist circumference explains obesity related health risks, not BMI (Janssen I; 2004) and regardless of gender, waist and waist to hip ratio increases with the age (Stevens J; 2010).

Using the IHCC and Saudi Arabian data, we would like to build a similar model and assess whether we can estimate BMI using waist and hip circumference as an alternative to height and weight.

OBJECTIVE

To assess whether waist and hip circumference can estimate BMI correctly?

METHODOLOGY

Two different data sets were used in this study. One is from Pakistan and other is from Saudi Arabia. Pakistani data were obtained from The Indus Hospital Community Cohort (IHCC) a tertiary care hospital of Karachi, Pakistan and the Saudi Arabian data were obtained from a country wide survey for assessing risk factors of Coronary Artery Disease (CAD). The sample size for IHCC data was 427 (151 males, 276 females) and sample size for Saudi Arabian data was 14343 (7084 males, 7259 females).

The data were analyzed using SPSS version 16.0. Mean ± SD were computed for all the quantitative variables BMI, age, height, weight, hip and waist circumference. Frequency and percentage were computed for qualitative variable. Multiple linear regression was applied to establish a model for estimation of BMI using waist and hip circumference. Pearson correlation, age adjusted correlation and matrix plot was used to assess linear relationship between variables. Multicollinearity between independent variables was checked using variance inflation factor (VIF) and tolerance (TOL).

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[1] http://www.acefitness.org/fitnessqanda/fitnessqanda_display.aspx?itemid=362

Assumption of normality of errors was checked using PP plots. To adequacy of fitted models was checked by using both R^2 and adjusted R^2. Moreover, intraclass correlation was used to check the agreement between observed and estimated BMI values and for the sake of reliability error estimation was done by evaluating difference between observed and estimated BMI individually.

Furthermore, the trends results of this study were matched with the trends of Ghias et al. study results.

RESULTS

There was a significant linear relationship of hip and waist circumference with BMI in both the datasets (Table 1 and Matrix plot not shown) which matches with the trend of Ghias study results. The proposed models for both the genders for both the datasets were found to be good fitted and errors were found to be normally distributed using PP plots (Graphs not shown). The differences in R^2 of regression models of both the datasets were might be due to the differences in both the countries' population body structure. The Table-2 of both IHCC and Saudi Arabian datasets shows the agreement between observed and estimated BMI. The value of ICC coefficient was high, showing that the observed and estimated BMI values agreed well. Table-3 shows the descriptive analysis of anthropometric measurements and various characteristics of participants. From this table it can be seen that the Standard deviation of estimated BMI values was smaller than the observed BMI which shows that the variation in estimated values was less in comparison to observed BMI.

Table-4 in both IHCC and Saudi Arabian data analysis shows the frequency of residual computed from the data using the proposed models of estimation for Male, Female and overall population. It showed that BMI for Pakistani population (IHCC data) can be estimated within ± 1 with 30% accuracy and with 19% only for Saudi Arabian data. Ghais et al. in their study did not compute residuals but had showed a very small portion of their data and from that table residuals were evaluated for comparison purpose (Table-3; Ghais et al. study results). Table showed that most of the errors did not fall within ± 1 for both males and females.

CONCLUSION

The regression model is good fitted, intraclass correlation is high, variability is less in estimated values and no differences in the mean values of estimated and observed BMI; nevertheless BMI cannot be estimated using the predicted model based on waist and hip circumferences as there are huge differences in the estimated and observed BMI individually. The results showed that the estimation of BMI with waist and hip measurements using linear regression should be inferred with caution.

IHCC DATA:

The proposed linear regression models for estimating BMI we designed and used for males and female subjects were as follows (P-value; un standardized SE):

For males:

BMI= -5.684 + 0.70 (hip circumference) +0.256 (waist circumference)

(0.000; 1.170) (0.000; 0.030) (0.000; 0.026)

R=0.842; R-square=0.708; Adjusted R-square=0.703

For females:

BMI= -10.310 + 0.200 (hip circumference) +0.182 (waist circumference)

(0.000; 1.224) (0.000; 0.025) (0.000; 0.021)

R=0.890; R-square=0.793; Adjusted R-square=0.791

Table 1:
Correlation Coefficients

	Waist Circum (cm)	Hip Circum (cm)
BMI	0.842 P-value=0.000	0.792 P-value=0.000
Controlling for age		
BMI	0.839 P-value=0.000	0.802 P-value=0.000

Table 2:
Correlation Between Observed and Estimated BMI

	Estimated BMI	
	Correlation	Intraclass Correlation
Observed BMI	0.867 P-value=0.000	0.924 P-value=0.000

Table 3:
Descriptive Analysis

		Overall	Male	Female
	n	14343	7084	7259
Age (years)		34.28 ± 14.48	34.68 ± 15.48	34.06 ± 13.92
Height (cm)		156.63 ± 10.73	164.87 ± 9.06	152.13 ± 8.72
Weight (kg)		54.25 ± 12.43	57.81 ± 12.62	52.30 ± 11.90
Waist circum (cm)	Mean ± SD	80.49 ± 12.79	80.74 ± 11.945	80.35 ± 13.24
Hip circum (cm)		91.13 ± 10.60	89.91 ± 10.20	91.81 ± 10.77
BMI		22.15 ± 4.78	21.26 ± 4.33	22.64 ± 4.95
BMI-Estimated		22.15 ± 4.14	21.26 ± 3.64	22.64 ± 4.41

Overall	Range	Minimum	Maximum
Observed BMI	26.86	12.7	39.56
Estimated BMI	25.23	12.52	37.75

Table 4:
Error Estimation

Error	Overall		Male		Female	
	N	%	N	%	N	%
<-5	9	2%	-	-	9	3%
-5 to <-3	42	10%	12	8%	17	6%
-3 to -1	94	22%	47	31%	62	22%
>-1 to -0.5	38	9%	12	8%	27	10%
-0.049 to 0.00	35	8%	9	6%	23	8%
0.01 to 0.049	24	6%	7	5%	18	7%
0.05 to <1	31	7%	10	7%	20	7%
1 to 3	107	25%	40	26%	77	28%
>3 to 5	43	10%	10	7%	21	8%
>5	4	1%	4	3%	2	1%
Total	427	100%	151	100%	276	100%
Within ± 1	128	30%	38	25%	88	32%
Within ± 0.5	59	14%	16	11%	41	15%
<-1 and >1	299	70%	113	75%	188	68%

SAUDI ARABIAN DATA:

The proposed linear regression models for estimating BMI we designed and used for males and female subjects were as follows (P-value; un standardized SE):

For males:

BMI= 3.081+ 0.060 (hip circumference) +0.196 (waist circumference)
(0.000; 0.246) (0.000; 0.030) (0.000; 0.030)
R=0.771; R-square=0.595; Adjusted R-square=0.594

For females:

BMI= 1.092 + 0.101 (hip circumference) +0.190 (waist circumference)
(0.000; 0.263) (0.000; 0.002) (0.000; 0.003)
R=0.778; R-square=0.606; Adjusted R-square=0.606

Table 1:
Correlation Coefficients

	Waist Circum (cm)	Hip Circum (cm)
BMI	0.678￼ P-value=0.000	0.612￼ P-value=0.000
Controlling for age		
BMI	0.689￼ P-value=0.000	0.610￼ P-value=0.000

Table 2:
Correlation Between Observed And Estimated BMI

	Estimated BMI	
	Correlation	**Intraclass Correlation**
Observed BMI	0.752 P-value=0.000	0.839 P-value=0.000

Table-3: Descriptive Analysis

		Overall	**Male**	**Female**
	n	**427**	**151**	**276**
Age (years)		46.26 ± 11.62	48.99 ± 11.83	43.62 ± 10.78
Waist circum (cm)		91.95 ± 13.67	94.74 ± 12.92	89.24 ± 12.63
Hip circum (cm)	Mean ± SD	102.38 ± 15.69	100.17 ± 14.56	104.53 ± 16.44
BMI		28.11 ± 4.32	27.57 ± 4.05	28.64 ± 4.497
BMI-Estimated		28.11 ± 3.24	27.57 ± 3.12	28.64 ± 3.500

Overall	**Range**	**Minimum**	**Maximum**
Observed BMI	29.57	16.30	45.87
Estimated BMI	38.34	7.01	45.35

Table 4:
Error Estimation

Error	**Overall**		**Male**		**Female**	
	N	**%**	**N**	**%**	**N**	**%**
<-5	234	1.6%	37	0.5%	234	3.2%
-5 to <-3	1909	13.3%	685	9.7%	858	11.8%
-3 to -1	3640	25.4%	1992	28.1%	1650	22.7%
>-1 to -0.5	974	6.8%	580	8.2%	450	6.2%
-0.049 to 0.00	929	6.5%	601	8.5%	477	6.6%
0.01 to 0.049	829	5.8%	540	7.6%	466	6.4%
0.05 to <1	858	6.0%	456	6.4%	465	6.4%
1 to 3	2620	18.3%	1293	18.3%	1504	20.7%
>3 to 5	1617	11.3%	596	8.4%	910	12.5%
>5	733	5.1%	304	4.3%	245	3.4%
Total	14343	100%	7084	100%	7259	100%
Within ± 1	2661	19%	2177	31%	1858	26%
Within ± 0.5	829	6%	1141	16%	943	13%
<-1 and >1	5204	36%	4907	69%	5401	74%

GHIAS et al:

For males:
   BMI= -10.71 + 0.212 (hip circumference) +0.170 (waist circumference)

For females:
BMI= -15.168+0.143 (hip circumference) +0.30 (waist circumference)

Table 1: Correlation Coefficients

	Waist Circum (cm)	Hip Circum (cm)
BMI	0.795 P-value=0.000	0.838 P-value=0.000

Table-2: Descriptive Analysis

Population	Overall	Male	Female
n	24485	10687	13798
AGE(Years)	50.16±10.828	50.77±11.304	49.68±10.421
Weight(Kg)	70.14±14.229	73.41±14.167	67.61±13.729
Height(Cm)	159.59±9.158	167.34±6.571	153.60±5.749
BMI(Kg/m2)	27.54±5.212	26.16±4.569	30.61±5.423
Waist(Cm)	95.82±11.854	95.70±11.837	95.87±12.057
Hip(Cm)	99.09±10.499	97.81±9.499	100.03±11.419

Table-3: Comparison of Observed and Estimated BMI

Observed BMI	Waist (cm)	Hip (cm)	Estimated BMI	Error	
MALE					
25	89	101	27.859	-2.86	<-1
34	101	123	36.175	-2.18	<-1
29	101	106	31.075	-2.08	<-1
25	93	95	26.631	-1.63	<-1
32	99	115	33.489	-1.49	<-1
31	102	108	31.818	-0.82	Within±1
31	98	109	31.546	-0.55	Within±1
24	86	91	24.43	-0.43	Within±1
37	129	108	35.679	1.32	>1
40	108	124	37.476	2.52	>1
40	108	124	37.476	2.52	>1
FEMALE					
25	98	102	27.355	-2.36	<-1
27	101	97	27.038	-0.04	Within±1
26	93	100	26.013	-0.01	Within±1
32	117	107	31.984	0.02	Within±1
31	109	106	30.235	0.77	Within±1
25	93	88	23.841	1.16	>1
27	96	94	25.515	1.49	>1
24	83	90	22.243	1.76	>1
23	80	85	20.75	2.25	>1
37	121	109	33.13	3.87	>1
37	121	109	33.13	3.87	>1

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A REVIEW ON KAPPA RELIABILITY METHODS

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ABSTRACT

Reliability studies evaluate the extent to which the results agree when obtained by different observers, study instruments or procedures (inter-examiners) or by the same observer at different points in time (Intra-examiner). **Objective**: The objective of study is to review of literature concerning the Kappa Statistic, a method to find inter- and Intra-examiners reliability with categorical data. The main emphasis of this study is to collect all the literature available on this subject for critical appraisal and systematic review. **Methodology**: For collecting the literature different search engines, websites, libraries and journals was used. Kappa method was first introduced by Cohan in 1960. Kappa statistic has received considerable attention in the literature. Lots of work is available in this field but very basic work is being used in medical community. In this paper we will summarize the pioneer articles by Cohen (1960, 1968), Fleiss and Everitt (1969), Light (1971), James (1983), Tanner and Young (1985) and Kilem Gwet (2002) on this subject, so that it can be used in different situation which arises in inter- and intra- examiner reliability. **Conclusion**: Lots of work have been done to explore the different situations regarding inter-and intra-examiner reliability. Nevertheless, serious problems still exist in those methods, especially with small sample size.

1. INTRODUCTION

Inter examiner reliability can be measured in which two or more observers are evaluating the same thing. Various procedures are available for measuring the agreement among observers who classify responses among nominal categories. Percentage agreement and chi-square methods were frequently used to measure inter-examiner reliability, but these measures were misleading. Percentage agreement rates do not take into account the agreement that would expect due to chance. Chi-square measures only the association between set of rating that do not determine the agreement. The Kappa coefficient has been recommended a useful measure for measuring agreement due to overcoming these problems. The Kappa statistics was first introduced by Cohan in 1960. In this paper we review the pioneer literature of Kappa statistics.

2. LITERATURE REVIEW

Cohan (1960) suggest that for any problem in nominal scale agreement between two judges, there are only two relevant quantities

P_0 = the proportion of units in which the judges agree

P_e = the proportion of units for which agreements is expected by chance

The test of agreement comes than with regards to the $1 - P_e$ of the units for which the hypothesis of no association would predict disagreement between the judges. The term $1 - P_e$ refer to as denominator. The difference between $P_0 - P_e$ represents the proportion of the cases in which beyond-chance agreement occurred and is the numerator of the kappa coefficient.

The coefficient k is simply the proportion of chance-expected disagreement which does not occur, or alternatively, it is the proportion of agreement *after* chance agreement is removed from consideration.

$$= \overline{}$$

The limit of coefficient k was also defined by Cohan. Possible value of k range from -1 to 1. When obtained agreement equals chance agreement, k=0. Greater than chance agreement leads to the positive value of k, less than chance agreement leads to negative values. There is perfect agreement between the judges when k =1, the necessary condition for perfect agreement is that the p_{iA}'s $= p_{iB}$'s (i varies from 1 to k) i.e. when the marginal's are same for the judges.

An interesting characteristic of k is its identity with   , the product-moment correlation in the dichotomous case when the judges give the same marginal distribution. The identity of the two coefficients under the condition of equal marginal tells us something about   , that under the conditions states, it is interpretable as the proportion of agreement after allowance for chance.

For hypothesis testing, its standard error and techniques for estimation are also presented by Cohan (1960). An approximation to the standard error of k is given by

$$= \frac{\overline{(\quad)}}{_-}$$

The formula is an approximation since it treats Pe as constant and treats   as if it were the population value. When N large i.e. $\geq$ the sampling distribution of k will approximately normality so that confidence limit can be set in the usual way

% $= \pm$.
% $= \pm$. $_-$

The standard error of k when the population k=0 and used for one – sample significance test of k

$$= \frac{\overline{}}{(\quad)}$$

Tests of the significance of the difference between two independent k's can be performed by evaluating the normal curve deviate

$$= \overline{}$$

To test an obtained k for significance, i.e. to test the null hypothesis that it arose in sampling from a population of units for which $k_p = 0$. The significance is determined by dividing k by   and referring the resulting critical ratio to the normal curve. It needs pointing out that it is generally of a little value to test k for significance as it is for any other reliability coefficient.

In 1968 Cohan presents the generalization to weighted kappa (k_w). The development of weighted kappa is motivated by studies in which it is the scene of the investigator that some disagreements in assignments, that is some diagonal cells in the k × k matrix, are of greater gravity than others.

The proportion of weighted agreement corrected for chance, to be used when different kinds of disagreement are to be differentially weighted in the agreement index. The sampling distribution of weighted k also developed. The asymptotic (large sample approximation) standard error of k_w is

$$\cong \quad \frac{\Sigma \qquad \Sigma[(\quad)]}{\Sigma[(\quad)]}$$

The sampling distribution of k_w is approximately normal for large samples, it is used for setting confidence limits on a sample k_w together with the appropriate unit normal curve deviate. For a normal curve test of the significance of the difference between two independent k_ws

$$= \quad \overline{\underline{\qquad}}$$

For one sample test of k_w, population weighted kappa is zero needed. The standard error for one sample test is

$$= \quad \frac{\Sigma \qquad \Sigma[(\quad)]}{\Sigma[(\quad)]}$$

A significance test of $k_w = 0$ is accomplished by evaluating the normal curve deviate

$$= \quad \overline{\qquad}$$

Although Cohan developed weighted kappa as a measure of reliability, the use of unequal weights for symmetrical cells makes k_w suitable as a measure of validity.

Fleiss and Everitt (1969) pointed out that large sample standard error formula for both kappa and weighted kappa provided by the Cohan (1960, 1968) has some error. The error in formula seems to be in the direction of overestimation, so that the use of incorrect formula misleads the result of the significance test and confidence limits.

Author stated that due to the contradictory assumption of fixed marginal total and binomial variation of cell frequencies these expressions are incorrect. Everitt (1968) derived the exact variance of weighted and unweighted kappa when the parameters are zero by assuming a generalized hypergeomatric distribution. He found these expressions

to be more complicated for routine use and offered another expression by assuming binomial distribution. These alternative expressions are incorrect so the exact variance expressions use to find the variance.

In 1971, R.J. Light has done remarkable work in the field of kappa statistics. He considered the following issues; first he argued that agreement was special case of agreement. Then distinguished several type of agreement and suggest that each type required a different sort of measurement procedure. Finally presents the extension for and alternative to techniques currently used to measure agreement. Structuring data for the agreement problem in the format of contingency table enable researchers to utilize some well-known results to develop the measures.

Consider the situation If the data consist of two observer categorizing n item among C categories then researcher might asked about the agreement between the two observers for only those item which one observer placed into ith specific category. Light argue that the distinction between agreement and association for nominal data was that for two or more responses to agree, they must fall into the identical category, while for two responses to be associated required that the category of one response can be predicted from knowledge of the other's category. Thus agreement is special case of association. Table may show low agreement and high association, as well as high agreement and high association.

Light suggested that for better analysis of data, when measuring agreement the researcher can partition k into a set of partial k's, k_i, $i= 1,2,…C$. By using the idea of some unpublished work of Coleman[2], where he summing agreeing and disagreeing pair to develop a conditional version of k. Taking a C×C table, a measure of agreement between the two observers for those item which the first observer (appearing on the rows of the table) assigned to the ith specific category.

$$ k_i = \frac{}{} - \frac{\overline{\quad}}{\overline{\quad}} $$

Light also discussed the situation where more than two observers, (say m observer) each assign n item among C categories, stated that the extension follows directly from the idea of taking pairs of observer's assignment of an item, and seeing whether both observers assign the item to the same category or to different categories. The general form of the multiple agreement statistics is identical to the k's form of $1- \dfrac{d_o}{d_e}$ where d_o is the observed proportion of disagreement and d_e the expected proportion of disagreement given the m observed marginal. The large sample standard error and conditional measure of k_m were also developed.

Light (1971) also focused on slightly different problem. It was observed that generally all the k type measure of agreement have two common properties.

1. First, they assume nothing about a "true or correct" assignment of item to categories. Responses of observers are not measured relative to any "standard" but rather only with respect to their internal consistency
2. In the case of more than two observers, kappa treats all the observers with equal weights. Thus k might be interpreted as an "overall group agreement" measure.

In some situation these two properties are not appropriate. It may be reasonable to assume a "correct set" of responses. To which we wish to compare the responses of two or more observers. To solve this problem Light proposed alternative procedure, developed the G statistics to test the hypothesis of "random agreement" of the group of m observers relative to the "correct" categorization. The review of Light (1971) provides a valuable overview of earlier work of Kappa statistics.

In 1983 Ian R. James pointed out that during the analysis much less attention seems to have paid for nonagreement when three or more categories are used in the classification. He was concerned with the classification procedure of kappa statistics. A method is proposed for the analysis of nonagreements among multiple raters. The method is based on the notation of impartiality of nonagreeing assignments, and by this method one can show that atmost one category can be nonassociated with each of the other. Impartiality was defined in term of certain conditional probabilites, and the necessary asymptotic distribution theory and testing procedure were developed.

To investigate agreement from the perspective of population model rather than in term of a procedure used to compute a test statistics. Tanner and Young (1985) proposed an approached to the modeling of agreement among raters. Specifically, agreement is investigated using a log-linear model with two component, the first component represents the effect of chance, and the second component represents the effect of rater agreement. The specification of chance and agreement component of the model provides a general framework for modeling agreement in a variety of situation. Limits of agreement define as it the residual from the model of specific group is positive the agreement is positive. A given parameter is negative if the residual are negative i.e. there is less agreement in cells than expected by chance.

Kilem Gwet(2002) provide a detailed discussion about the limitation of kappa statistics, as it is most widely used statistics the limitation misleads the result. Gwet discuss the problem by explaining two example in which it was observed that their is very good association between the raters but the kappa value is surprisingly very low which show low agreement between the raters. Researcher believe that their is serious conceptual flaw presents in the assumption of kappa coefficient that makes results unreliable. Result especially misleading when the sum of the marginal probabilities is very different from 1.it was proved that unpredictable behaviour of kappa statistics is due to a wrong method of computing chance agreement probability. A limitation of kappa is that it is affected by the prevelance of the finding underobservation. Most of the researcher recommended the testing of marginal hominginity to determine the adequecy of kappa statistics. Gwet(2002) introduce an alternative more robust chance-corrected statistics that consistently yield reliable results. The ACI statistics introduce to find the chance corrected coefficient which provides more reliable result.

3. COMMENTS AND CONCLUSION

In this paper, we have reviewed the pioneer literature available in the field of kappa statistics. For reliability analysis it is most widely used statistics, researchers faced problem during the analysis. It was also observed during review that lot of development had been occurred. However, it was scattered all over the literature. Therefore, this

review has compiled the thing into at one place to avoid unreliable result and to know the problems relating to kappa statistics.

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NEURAL NETWORKS A GATEWAY TO NON-LINEAR DATA MODELING TECHNIQUES

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ABSTRACT

A computational neural network is a set of non-linear data modeling tools consisting of input and output layers plus one or two hidden layers. The connections between neurons in each layer have associated weights, which are iteratively adjusted by the training algorithm to minimize error and provide accurate predictions. The procedures in SPSS neural networks complement the traditional statistics and its modules. In this paper effort is made to find new associations in the data with neural networks and confirm their significance with traditional statistical techniques.

KEY WORDS

Neural network, Nonlinear data modeling, Procedures in SPSS.

1. INTRODUCTION

The term neural network refers to a network of biological neurons [1]. The modern usage of the term often refers to artificial neural networks, which are composed of artificial neurons or nodes. Thus the term neural network has been classified into biological neural networks which are made up of real biological neurons that are functionally related in a nervous system and artificial neural networks that are composed of interconnecting artificial neurons. Artificial neural networks can be used to understand the biological neural networks.

This paper focuses on the artificial neural network and its applications to non-linear data modeling techniques. So, an artificial neural network (ANN) is an information processing system that is inspired by the biological nervous systems, such as processing of information by brain. It is composed of a large number of highly interconnected processing elements (neurons) working in unison to solve specific problems.

2. HISTORICAL BACKGROUND

Neural network simulations appear to be a recent development. However, this field was established before the advent of computers. The first artificial neuron was produced in 1943 by the neurophysiologist Warren McCulloch and the logician Walter Pits. In a neural network model simple nodes are connected together to form a network of nodes — hence the term "neural network". The concept of a neural network appears to have first been proposed by Alan Turing in his paper "Intelligent Machinery" in 1948.

3. LITERATURE REVIEW

Neural networks, as used in artificial intelligence, have traditionally been viewed as simplified models of neural processing in the brain. The origins of neural networks are based on efforts to model information processing in biological systems, which may rely largely on parallel processing as well as implicit instructions based on recognition of patterns of 'sensory' input from external sources. In other words a neural network is a complex statistical processor.

The terminology of artificial neural networks has developed from a biological model of the brain. A neural network consists of a set of connected cells: The neurons. The neurons receive impulses from either input cells or other neurons and perform some kind of transformation of the input and transmit the outcome to the other neurons or to output cells. The neural networks are built from layers of neurons and pass the output on to the subsequent layer.

Neural coding is concerned with how sensory and other information is represented in the brain by neurons. The main goal of studying neural coding is to characterize the relationship between the stimulus and the individual or ensemble neuronal responses and the relationship among electrical activity of the neurons in the ensemble. [2] It is thought that neurons can encode both digital and analog information. [3]

A neural network (NN), in the case of artificial neurons called artificial neural network (ANN) or simulated neural network (SNN), is an interconnected group of natural or artificial neurons that uses a mathematical or computational model for information processing based on a connectionistic approach to computation. In most cases an ANN is an adaptive system that changes its structure based on external or internal information that flows through the network [10].

In more practical terms neural networks are non-linear statistical data modeling or decision making tools. They can be used to model complex relationships between inputs and outputs or to find patterns in data.

4. CHARACTERISTICS OF NEURAL NETWORK

- The Neural Networks exhibits mapping capabilities that are they can map input patterns to their associated out puts patterns.
- The Neural Networks learns by examples. Thus, architecture can be trained with known examples of a problem before they are tested for their inference capability on unknown instances of the problems. They can identify new objects previously untrained.
- The Neural Networks possesses the capability to generalise. Thus, they can predict new outcomes from the past trends
- The Neural Networks are robust systems and are fault tolerant; they can therefore recall full patterns from incomplete, partial or noisy patterns.
- The Neural Networks can process information in parallel, at high speed and in a distributed manner.

5.   NEURAL NETWORKS ARCHITECTURE

It is defined as a data processing system consisting of a large number of simple highly connected processing elements in an architecture inspired by the structure of the cerebral cortex of the brain, The most widely used neural networks are as under:

5.1 Feed Forward Network

In feed forward network information flows in one direction along connecting pathways from the input layers via the hidden layers to the final out put layer. There is no feedback the output of any layer does not affect that same or proceeding layer.

5.2 Recurrent Networks

These networks differ from feed forward network architecture. In the sense, that there is at least one feedback loop. The output of a neuron is feed back into itself as input.
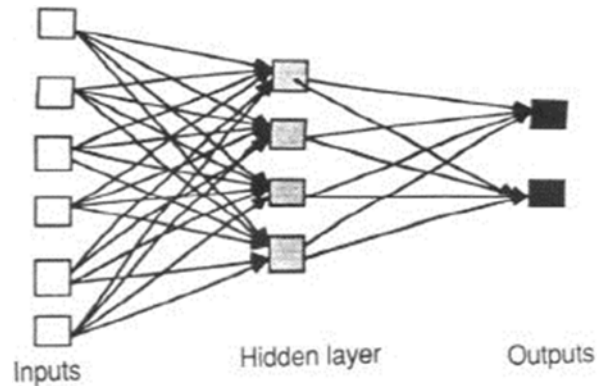
Fig. 5.1: An Example of a Simple Feed Forward Network [10]
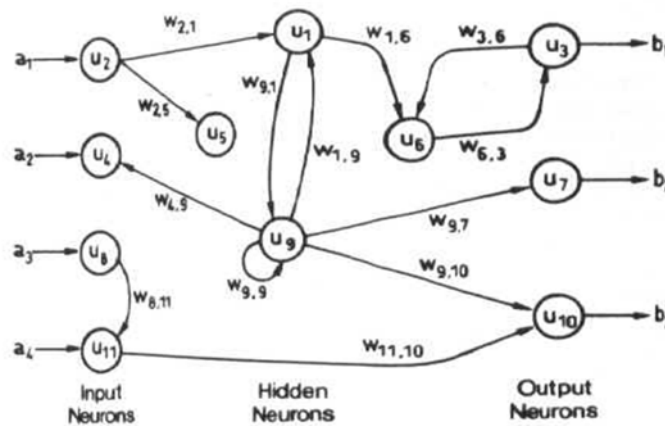
Figure 5.2 an example of a complicated network [10]

6. PROCEDURE FOR DEVELOPING AN ARTIFICIAL NEURON NETWORKS MODEL

The following procedure is adopted for developing the neuron networks model

- Selection of variables for the model
- Formation of training, testing and validation sets
- Defining the numbers of hidden layers, hidden nodes and output nodes
- Evaluation criteria for the neural network model
- Setting neural network training objectives

7. USAGE OF NEURAL NETWORKS

Neural networks, with their remarkable ability to derive meaning from complicated or imprecise data, can be used to extract patterns and detect trends that are too complex to be noticed by either humans or other computer techniques. A trained neural network can be thought of as an "expert" in the category of information it has been given to analyses. This expert can then be used to provide projections given new situations of interest and answer "what if" questions.

8. ADVANTAGES OF NEURAL NETWORK

- **Adaptive learning**: an ability to learn how to do tasks based on the data given for training or initial experience.
- **Self-Organization:** an artificial neural network can create its own representation of the information it receives during learning time.
- **Real Time Operation**: artificial neural network computations may be carried out in parallel, and special hardware devices are being designed and manufactured which take advantage of this capability.
- **Fault Tolerance via Redundant Information Coding**: Partial destruction of a network leads to the corresponding degradation of performance. However, some network capabilities may be retained even with major network damage.

9. NEURAL NETWORKS VERSUS COMPUTERS

Neural networks take a different approach to problem solving than that of conventional computers. Conventional computers use an algorithmic approach i.e. the computer follows a set of instructions in order to solve a problem. That restricts the problem solving capability of conventional computers to problems that we already understand and know how to solve it. Neural networks process information in a similar way the human brain does. The network is composed of a large number of highly interconnected processing elements (neurons) working in parallel to solve a specific problem. Neural networks learn by example. They cannot be programmed to perform a specific task.

On the other hand, conventional computers use a cognitive approach to problem solving; the way the problem is to solved must be known and stated in small unambiguous instructions. These instructions are then converted to a high level language

program and then into machine code that the computer can understand. These machines are totally predictable; if anything goes wrong is due to a software or hardware fault. Neural networks and conventional algorithmic computers are not in competition but complement each other. Neural networks do not perform miracles, but if used sensibly then they can produce some amazing results.

10. APPLICATIONS OF ARTIFICIAL NEURAL NETWORKS

The tasks to which artificial neural networks are applied tend to fall within the following broad categories:
- function approximation, or regression analysis, including time series prediction and modeling
- Classification, including pattern and sequence recognition, novelty detection and sequential decision making.
- Data processing, including filtering, clustering, blind signal separation and compression.

Application areas of artificial neural networks include system identification and control (vehicle control, process control), game-playing and decision making (backgammon, chess, racing), pattern recognition (radar systems, face identification, object recognition), sequence recognition (gesture, speech, handwritten text recognition), medical diagnosis, financial applications, data mining (or knowledge discovery in databases, "KDD"), visualization and e-mail spam filtering.

10.1 Neural Networks in Practice

Since neural networks are best at identifying patterns or trends in data, they are well suited for prediction or forecasting needs including: sales forecasting, industrial process control, customer research, data validation, risk management and target marketing.

Artificial neural network is also used in the following specific paradigms: recognition of speakers in communications; diagnosis of hepatitis; recovery of telecommunications from faulty software; interpretation of multimeaning Chinese words; undersea mine detection; texture analysis; three-dimensional object recognition; hand-written word recognition; and facial recognition.

10.2 Neural Networks in Medicine

An artificial neural network is currently a 'hot' research area in medicine and it is believed that they will receive extensive application to biomedical systems in the next few years. At the moment, the research is mostly on modeling parts of the human body and recognizing diseases from various scans [6] (e.g. cardiograms, CAT scan, ultrasonic scans, etc.).

10.2.1 Diagnosing the Cardiovascular System

Neural networks are used experimentally to model the human cardiovascular system. Diagnosis can be achieved by building a model of the cardiovascular system of an individual and comparing it with the real time physiological measurements taken from the patient [7].

A model of an individual's cardiovascular system must mimic the relationship among physiological variables (i.e., heart rate, systolic and diastolic blood pressures, and breathing rate) at different physical activity levels. If a model is adapted to an individual, then it becomes a model of the physical condition of that individual.

Another reason that justifies the use of artificial neural network technology is the ability of artificial neural networks to provide sensor fusion which is the combining of values from several different sensors.

10.2.2 Electronic noses

Artificial neural networks are used experimentally to implement electronic noses. Electronic noses have several potential applications in telemedicine. Telemedicine is the practice of medicine over long distances via a communication link. The electronic nose would identify odours in the remote surgical environment. These identified odours would then be electronically transmitted to another site where a door generation system would recreate them. Because the sense of smell can be an important sense to the surgeon, telesmell would enhance telepresent surgery [8].

10.2.3 Instant Physician

An application developed in the mid-1980s called the "instant physician" trained an auto associative memory neural network to store a large number of medical records, each of which includes information on symptoms, diagnosis, and treatment for a particular case. After training, the net can be presented with input consisting of a set of symptoms; it will then find the full stored pattern that represents the "best" diagnosis and treatment.

10.3 Neural Networks in Business

Business is a diverted field with several general areas of specialization such as accounting or financial analysis. Almost any neural network application would fit into one business area or financial analysis. There is some potential for using neural networks for business purposes, including resource allocation and scheduling. There is also a strong potential for using neural networks for database mining.

10.3.1 Marketing Intelligence

The Airline Marketing Tactician (AMT) is a computer system made of various intelligent technologies including expert systems. A feed forward neural network is integrated with the AMT and was trained using back-propagation to assist the marketing control of airline seat allocations. The system is used to monitor and recommend booking advice for each departure. Such information has a direct impact on the profitability of an airline and can provide a technological advantage for users of the system.

10.3.2 Credit Evaluation Practices

The HNC Company has developed several neural network applications. One of them is the Credit Scoring system which has increased the profitability of the existing model up to 27%. The HNC neural systems were also applied to mortgage screening.

11. SOFTWARE FOR PROCESSING ARTIFICIAL
NEURON NETWORKS MODELS

In order to process neural network models that must be shared by different applications for that a common language is necessary. Recently, the Predictive Model Markup Language (PMML) has been developed to address this problem.

PMML is an XML-based language which provides a way for applications to define and share neural network models between PMML compliant applications.

Predictive Model Markup Language provides applications a vendor-independent method of defining models so that proprietary issues and incompatibilities are no longer a barrier to the exchange of models between applications. It allows users to develop models within one vendor's application, and use other vendors' applications to visualize, analyze, evaluate or otherwise use the models. Previously, this was very difficult, but with the Predictive Model Markup Language, the exchange of models between compliant applications is now straightforward.

12. PMML CONSUMERS AND PRODUCERS

A range of products are being offered to produce and consume PMML. This ever growing list includes the following neural network products:

- **R:** produces Predictive Model Markup Language for neural nets and other machine learning models via the package PMML.
- **SAS Enterprise Miner**: produces the Predictive Model Markup Language for several mining models, including neural networks, linear and logistic regression, decision trees, and other data mining models.
- **SPSS:** produces the Predictive Model Markup Language for neural networks as well as many other mining models.
- **STATISTICA**: produces the Predictive Model Markup Language for neural networks, data mining models and traditional statistical models.
- **Zementis ADAPA**: consumes the Predictive Model Markup Language by providing batch and real-time scoring of PMML for neural networks as well as several other data mining models.
- **MATLAB Neural Net Toolbox:** a comprehensive environment for neural network research, design, and simulation within MATLAB
- **SPSS Neural Connection 2:** with Bayesian Network, Data Output Tool, model weights and more
- **STATISTICA Neural networks: a** comprehensive and user-friendly application with many charting options, network architectures and training algorithms

DTREG Software: for predictive modeling and forecasting, it offers the most powerful predictive modeling methods such as:
- Multilayer Perceptron Neural Networks
- Probabilistic Neural Networks
- General Regression Neural Networks
- RBF Neural Networks

- GMDH Polynomial Neural Networks
- Cascade Correlation Neural Networks
- Support Vector Machine (SVM)
- Decision Trees
- Tree Boost - Boosted Decision Trees
- Decision Tree Forests
- K-Means Clustering
- Linear Discriminant Analysis (LDA)
- Linear Regression
- Logistic Regression-Symbolic Regression

The detailed list of computer software and hardware used for neural networks processing are given at Annexure-1. In this paper we have discussed some characteristics and capabilities of SPSS neural network software package for problem solving in neural networks environment.

13. SPSS NEURAL NETWORK

From statistical point of view neural network are very interesting, because of their potential use in prediction and classification. They are powerful tools for modeling. A neural network can identify and learn correlated pattern between input data sets and corresponding target values. After training neural network can be used to predict outcome of new independent input data

SPSS neural net is a lattice like network of neuron like nodes, set up with in Statistical Package for Social Sciences (SPSS) to act something like the neurons in a living brain. The connections between these nodes have associated weights (degree of relative effects), which are adjustable, when you adjust the weights of connections, the network is to learn. In SPSS neural network, training algorithm iteratively adjusts the weights to closely match the actual relationships among the data [4].

A computational neural network is a set of non-linear data modeling tools consisting of input and output layers plus one or two hidden layers. The connections between neurons in each layer have associated weights, which are iteratively adjusted by the training algorithm to minimize error and provide accurate predictions.

The aim is to minimize errors and maximize accurate predictions. The computational neural network has one layer of neurons for input, another layer for output, with one or more hidden layers between them. The neural network is combined with other statistical procedures to provide clearer insight.

SPSS Neural Networks offers non-linear data modeling procedures that enable us to discover more complex relationships in our data. Using the procedures in SPSS Neural Networks, we can develop more accurate and effective predictive models [5].

Using the SPSS statistics interface we can mine our data for relationships. After selecting procedure, we can specify the dependent variables which may be any combinations of scales and categorical types. To prepare for processing, we lay out the neural network architecture, including the computational resources we wish to apply. To

complete preparation, we choose what to do with the output such as: list the results in tables, graphically display the results in charts, place the results in temporary variables in the data set, and export models in xml formatted files.

13.1 Complement Traditional Statistical Techniques
The procedures in SPSS Neural Networks complement the more traditional statistics and its modules. Find new associations in our data with Neural Networks and then confirm their significance with traditional statistical techniques.

13.2 Using Data Mining Techniques
SPSS Neural Networks provides a complementary approach to the data analysis techniques available in SPSS statistics base and its modules. From the familiar SPSS Statistics interface, we can "mine" our data for hidden relationships, using either the Multilayer Perceptron (MLP) or Radial Basis Function (RBF) procedure.

Both of these are supervised learning techniques – that is, they map relationships implied by the data. Both use feed-forward architectures, meaning that data moves in only one direction, from the input nodes through the hidden layer or layers of nodes to the output nodes.

Our choice of procedure will be influenced by the type of data we have and the level of complexity we seek to uncover. While the MLP procedure can find more complex relationships, the RBF procedure is generally faster, with either of these approaches, the procedure operates on a training set of data and then applies that knowledge to the entire dataset, and to any new data.

13.3 Control the process from start to finish
After selecting a procedure, we specify the dependent variables, which may be scale, categorical or a combination of the two. We adjust the procedure by choosing how to partition the dataset, what sort of architecture we want and what computation resources will be applied to the analysis.

13.4 Display of Results
Finally, we choose whether we want to display results in tables or graphs, save optional temporary variables to the active dataset or export models in XML-based file format to score future data.

14. CONCLUSION

It is concluded that neural networks provides significantly better estimate of the classification rate for the unknown population as well as for the unseen part of the population. The computing world has a lot to gain from neural networks. Their ability to learn by example makes them very flexible and powerful. Furthermore there is no need to devise an algorithm in order to perform a specific task; i.e. there is no need to understand the internal mechanisms of that task. They are also very well suited for real time systems because of their fast response and computational times which are due to their parallel architecture. Neural networks, with their remarkable ability to derive meaning from

complicated or imprecise data, can be used to extract patterns and detect trends that are too complex to be noticed by either humans or other computer techniques.

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PROBING THE REASONS OF HIGH STUDENT DROPOUT RATE
IN GRADES 6 TO 9 AT PUBLIC SCHOOLS
OF DISTRICT JAMSHORO (SINDH-PAKISTAN) IN 2010-11

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ABSTRACT

The research aims at seeking out various reasons behind the high dropout rate of students in Grades 6 to 9 at public schools of district Jamshoro during 2010-11. This research involves the analysis of a different factors and indicators that are social, political, geographical and economic in nature to gauge their impact on the increasing student dropout tendency in target district. In this particular instance, 10 schools from district Jamshoro were conveniently selected. The data was collected through implementation of a close ended questionnaire for the teachers whereas for the community members and parents, interviews were taken while descriptive data analysis is used for data inference. The overall results of the study depict specific reasons behind the tendency of high dropout rates in the target district.

KEYWORDS

Dropout, students, teachers, parents, social & economic conditions.

1. INTRODUCTION

Education has a huge impact on any human society and it can safely be assumed that no society is optimally functional until it is properly educated. In the global perspective, it is an undeniable fact that the progress of a nation is very much dependent on the education of their citizens. On the other hand it is also widely acknowledged that education is amongst the single most important factors contributing to poverty alleviation of deprived and under-privileged communities therefore advocating the fact that education plays an overarching role in all aspects of human life. It is a vital investment for human and economic development. Unfortunately, in recent times, Pakistan's standing on this front has historically been poor, as can be seen in the given table:

Table 1:
Source: World Bank, UNDP, UNESCO, FBS, Ministry of Education

Comparison of Public Sector Spending on Education		
Country	Public sector spending (As % of GDP)	Literacy rate in (%)
Bangladesh	2.6	55.0
China	-	93.7
India	3.3	-
Indonesia	3.5	-
Iran	5.2	-
Malaysia	4.7	92.1
Nepal	3.2	57.9
Pakistan	2.1	57.0
Sri Lanka	…	90.6
Thailand	4.5	-
Vietnam	5.3	92.5

With public spending on education as a percentage of GDP amongst the lowest in some of the developing nations as shown above, the outcome with regard to literacy levels is not surprising. While literacy rate has shown some gradual improvement over a period of time in the global perspective, Pakistan's indicators on this front continue to rank at the bottom end of international rankings. To reason against this anomaly, Pakistan is a developing country but from an international viewpoint its literacy was previously ranked 142nd in the world (Govt. of Pakistan, 2000) and at present it is ranked[1] 159th amongst the 174 nations of the world.

Within the region, only Bangladesh has a worse outcome on both indicators, spending by the public sector as well as literacy rate. Nepal spends a substantial fraction more than Pakistan on education, while its literacy rate is marginally higher (Economic Survey of Pakistan, 2009-10).

To move forward, it can be established that Pakistan presents a paradoxical situation. The country was able to record 5 percent Annual Growth rate over a fairly long period of three decades: between 1960-90, bringing down the incidence of poverty to 18 percent. This happened when Pakistan's social indicators were dismally low in absolute, as well as, in relative terms. In 1990, after such impressive growth performance almost two-thirds of the country's population was illiterate, enrolment ratios were miserably low, the drop-out rates were quite high, gender disparities in access to education were rampant and the quality of higher education was on a declining path. By most indicators, basic schooling investments in Pakistan were low and growing less rapidly than on the average for low income countries. The reasons for Pakistan's low educational status are varied but one important factor is that Pakistan's educational system has been highly fragmented and segmented (Ishrat Hussain, 2005) in all sorts of different boards separately functioning, associations working in isolation, uncoordinated regulatory authorities etc.

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[1]http://www.studysols.com/pakistan-literacy-rate/

In this pre-text., the implementation of the EFA Plan of Action is likely to have a profound impact on the social development of the country. But it is also true that the attainment of Universal Primary Education (UPE) target could catalyze the making of educated citizens potentially capable of spearheading social, economic and political changes required to meet the challenges of the twenty-first century. The realization of EFA targets would also put the demands on the education system for expansion of facilities at all levels (Chapter 8, National Plan of Action - Pakistan).

Apparently, besides all the economic and socio-political constraints, efforts are made to enhance the budget allocation for education sector and improve the literacy rate in Pakistan. For making education free and compulsory for all, new schools and colleges are opened, basic facilities are provided and sustainable mechanisms are implemented (Govt. of Pakistan, 2003).However, to meet the demands of the modern world, such efforts may not be good enough.

Among the numerous factors affecting the situation of education in the region, the student dropout rate poses a major problem and remains uncontrolled at large. In the year 2003, only half of the children who enrolled in Grade-1 completed primary education (Govt. of Pakistan, 2003).

According to World Bank's study of Educational Indicators, policies to improve school progression and reduce the numbers of children dropping out of school are critical if Universal Primary Education (UPE) is to be achieved. Children are starting primary school in greater numbers than ever before but drop-out rates are significant and lead to low levels of primary school completion in many countries. In Benin (Africa), for example, the primary school completion rate in 2005 was 62 percent, although it increased steadily from 38 percent in 2000. In the Democratic Republic of Congo, the primary school completion rate in 2007 was 51 percent, which was the same completion rate for the country in the early 1990s. In Bangladesh, the primary school completion rate has remained around 60 percent since 2000.

As a result of substantial rates of drop out and non-completion of primary school many children are leaving schooling without acquiring the most basic skills. Their brief schooling experience consists frequently of limited learning opportunities in overcrowded classrooms with insufficient learning materials and under-qualified teachers (Alexander, 2008).

Reports do indicate that the number of children enrolled in schools has increased over time. Nevertheless, a significant proportion of the children who start primary school are not completing this cycle. There are many factors associated with student dropout rate, some of which pertain to an individual capacity, such as poor health or malnutrition and motivation. Others emerge from children's household situations such as child labor and poverty, tribal and communal problems etc. School level factors also play a role in increasing pressures to drop out such as teacher's absenteeism, school location and poor quality educational provision. The system of educational provision at the community level results in conditions that can ultimately impact on the likelihood of children being dropped out from school. Therefore, both demand and supply driven factors, are embedded in cultural and contextual realities, which make each circumstance different (Background Paper of Education for All Global Monitoring Report 2011, UNESCO).

Hence the key focus of this paper is to explore the reasons of high drop-out rates in the varied rural context of Sindh - Pakistan through targeting a sample of district Jamshoro.

2. JUSTIFICATION OF THE STUDY

The literacy rate in Sindh province in Pakistan has been an area of serious concern in recent times. According to the Pakistan Economic Survey 2010-11, the literacy rate in Sindh was 58.2%. It is clear that a number of factors contribute to this position and one of these factors has been a high dropout rate in lower as well as higher grades at public schools. According to the 'Statistical Bulletin Annual School Census 2010-11', following is the situation of dropouts in grades 6 to 9:

Table 2:
Dropout rates of 2010-11 Class Wise

Class	Dropout Rate
Class 6-7	6.69%
Class 7-8	5.45%
Class 8-9	8.12%
Class 9-10	8.78%

(Extracted from *Dropout Rates, 'Statistical Bulletin Annual School Census 2010-11',*
SEMIS-RSU Govt. of Sindh)

The dropout of students from public schools poses a major hurdle to achieving the Education for All (EFA) targets and Millennium Development Goals (MDGs). According to 'Statistical Bulletin Annual School Census 2010-11', it is also a growing concern to find out that this tendency is the highest in 2010-11 at Sindh as compared to last three years as shown below:

Table 3:
Dropout rates of 2008-09 till 2010-11 Class Wise

Class	2008-09	2009-10	2010-11
Class 6-7	6.55%	0.18%	6.69%
Class 7-8	4.33%	1.70%	5.45%
Class 8-9	7.23%	5.48%	8.12%
Class 9-10	3.70%	4.06%	8.78%

(Extracted from *Comparative Dropout Rates of years 2007-08 to 2010-11 Class Wise,*
'Statistical Bulletin Annual School Census 2010-11', SEMIS-RSU Govt. of Sindh)

In this case, among all the districts of Sindh province, district Jamshoro has indicated the highest dropout rate in Grades 6 to 9 as depicted in the following table:

Table 4:
Dropout Rates in Sindh, 2010-11

Districts	Gr. 1-2	Gr. 2-3	Gr. 3-4	Gr. 4-5	Gr. 5-6	Gr. 6-7	Gr. 7-8	Gr. 8-9	Gr. 9-10	Gr. 10-11	Gr. 11-12
Badin	30.80%	20.78%	18.37%	17.31%	40.15%	7.88%	9.22%	1.84%	9.76%	64.37%	-2.95%
Dadu	21.04%	7.68%	14.03%	14.94%	54.61%	5.91%	-1.95%	0.63%	8.47%	67.19%	3.29%
Hyderabad	15.89%	14.79%	14.31%	15.27%	20.18%	2.67%	2.69%	-4.67%	3.71%	80.92%	24.84%
Thatta	38.38%	27.04%	24.51%	25.27%	59.60%	11.71%	11.78%	5.89%	6.67%	64.16%	16.16%
Mirpurkhas	38.37%	23.50%	20.77%	21.69%	28.80%	11.08%	8.70%	4.70%	7.54%	61.46%	-6.96%
Tharparkar	33.69%	16.17%	10.58%	7.15%	36.53%	8.72%	5.27%	19.95%	0.50%	80.54%	6.50%
Sanghar	34.23%	17.15%	12.74%	12.92%	43.24%	1.73%	-0.68%	1.39%	6.58%	71.18%	10.94%
Karachi	16.01%	18.18%	17.07%	18.07%	9.60%	10.08%	6.11%	8.14%	9.60%	92.15%	-10.13%
Jacobabad	24.69%	8.18%	1.50%	5.74%	48.34%	8.27%	9.69%	23.55%	1.35%	62.05%	9.10%
Larkano	16.97%	10.77%	8.01%	4.63%	38.56%	3.53%	2.74%	3.00%	6.13%	83.50%	-10.86%
Shikarpur	27.51%	13.15%	10.97%	9.59%	45.11%	4.10%	-3.67%	5.87%	7.94%	63.67%	-10.25%
Khairpur	7.41%	11.00%	11.59%	14.61%	31.53%	1.48%	-1.66%	10.65%	9.05%	77.52%	-29.91%
Naushero	21.97%	12.35%	9.40%	14.46%	43.68%	2.57%	2.07%	9.96%	5.03%	76.10%	-11.13%
Benazirabad	9.39%	13.51%	9.98%	14.02%	41.74%	15.80%	17.79%	15.25%	17.39%	76.30%	13.75%
Sukkur	25.24%	19.11%	15.86%	19.01%	41.61%	4.20%	5.35%	6.45%	7.65%	74.75%	-12.49%
Ghotki	13.36%	11.71%	12.25%	14.41%	56.60%	5.56%	9.71%	7.58%	5.80%	78.76%	-28.94%
Umerkot	30.64%	21.53%	17.85%	12.52%	39.23%	2.25%	4.54%	8.69%	9.38%	48.00%	-23.29%
Jamshoro	20.41%	14.25%	14.08%	16.28%	39.05%	16.34%	21.65%	29.02%	36.14%	60.71%	3.75%
Matiari	35.54%	18.99%	16.34%	14.95%	36.26%	11.79%	9.47%	10.26%	13.16%	97.96%	82.14%
T A Yar	27.30%	25.48%	30.81%	22.70%	30.23%	7.27%	8.65%	14.61%	12.57%	77.57%	37.14%
T M Khan	27.69%	29.19%	28.21%	26.78%	52.09%	0.05%	10.70%	6.39%	5.17%	88.37%	-540.00%
Kashmore	18.55%	5.74%	7.61%	8.11%	61.02%	-6.41%	-7.09%	-3.40%	-28.92%	42.14%	-49.59%
Kamber	25.64%	19.92%	15.84%	13.81%	45.94%	6.23%	8.96%	17.11%	28.73%	78.50%	-137.97%

(The underlined figures depict the highest rates in respective level whereas district
Jamshoro has an alarming consistency of dropout from Grade 6 to 9)

(Extracted from *Comparative Anne 4, Dropout Rates of Districts of Sindh 2010-11,
'Statistical Bulletin Annual School Census 2010-11', SEMIS-RSU Govt. of Sindh*)

After completing a research of similar nature focusing the districts of Kashmore
(accepted for publication in HEC recognized "Journal of Research and Reflections in
Education", published by University of Education, Lahore), it was important to explore

the reasons behind a similar trend of dropout rates in a range of Grade level 6 to 9. The fact that Jamshoro had the highest dropout rate in Grades 6 to 9 as compared to any other district of Sindh advocating this study.

According to SEMIS Report (2010-11), in the district of Jamshoro;

"...There are total 30 middle (6-8) schools reported. The total enrollment at middle level is 2,919 of which 1,882 are boys' enrollment, whereas, the girls enrollment is 1,037. The total teachers at middle level are 103 out of which 78 are male teachers, while, 25 are female teachers. Thus on an average each middle school has average enrolment of 90 students with teaching staff of 3. However the student class ratio is 25 and each school has averagely around 4 class rooms.

There are total 34 secondary (9-10) schools. The total enrollment at secondary level is 9,888 of which 6,532 are boys' enrollment whereas 3,356 are girls' enrollment. The total no. of teachers at secondary level is 508 out of which male teachers are 367 and female teachers are 141. Thus on an average each secondary school has average enrolment of 285 students with teaching staff of 14. However the student class ratio is 38 and each school has averagely around 8 class rooms…"

Table 5:
Student dropout rates of District Jamshoro, 2010-11

Gr. 1-2	Gr. 2-3	Gr. 3-4	Gr. 4-5	Gr. 5-6	Gr. 6-7	Gr. 7-8	Gr. 8-9	Gr. 9-10	Gr. 10-11	Gr. 11-12
20.41%	14.25%	14.08%	16.28%	39.05%	16.34%	21.65%	29.02%	36.14%	60.71%	3.75%

(Extracted from *Comparative Anne 4, Dropout Rates of Districts of Sindh 2010-11, 'Statistical Bulletin Annual School Census 2010-11', SEMIS-RSU Govt. of Sindh*)

3. RESEARCH QUESTIONS

i. What are the causes of high dropout rate of students from Grades 6 to 9 at public schools of district Jamshoro during 2010-11?
ii. What are the possible remedies to ensure the continuation of education from Grades 6 to 9 in public schools at Jamshoro?
iii. How can the Governance of Education at district level be made effective to tackle problems such as student dropout?

4. OBJECTIVES OF THE STUDY

i. To find out the reasons behind high dropout rate from Grade 6 to 9 in district Jamshoro.
ii. To analyze the different economic, social, political, geographical, and demographical factors that affect the dropout tendencies from Grade 6 to 9.
iii. To chalk out remedial measures in order to minimize or nullify the factors which adversely affect the student retention.

5. METHODOLOGY

The research universe in this context is the province of Sindh (Rural) where drop-out rates from Grades 6 to 9 have been an area of concern. More specifically, the population under consideration is the district of Jamshoro.

In the past year, the district Jamshoro depicted the highest drop-out rates of students in Grade 6 to 9 (Refer to Table 4). Through the convenient sampling technique, a sample of 10 Schools was selected from the District Jamshoro. Furthermore, using convenient & purposive sampling, 20 class teachers were selected (from selected 10 Schools) for the study and the relevant data was gathered using a research tool (close-ended questionnaire translated into mother tongue). In addition to that, the selection of 20 parents was based on snowball sampling technique. Lastly, the sample of 40 community members was selected using convenient-random sampling for this study. The information from parents and community members was obtained through interviews as most of them were not able to read or write.

The data gathered from the teachers and the information collected from parents and community members was analyzed using the percentage method.

6. FINDINGS OF THE STUDY

Table 6:
Responses of Teachers regarding Reasons behind Dropout of Students

S#	Statement	Percentage (%)				
		Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
1	Many people of the community are not aware of the existence of the school in their vicinity.	52	25	2	13	8
2	There are not enough schools (middle/secondary) for students to get enrolled.	82	12	1	4	1
3	Children do not attend school due to parent's lack of interest.	75	6	2	7	10
4	Children go to work and earn a living instead of coming to school.	60	25	5	11	4
5	Children stay back home and help their parents and family in work.	40	20	2	25	13
6	Children are not sent to school due to serious financial problems at home.	30	13	2	20	25
7	Parents do not send children to school for reasons of early age marriages.	20	22	3	25	30
8	Parents send their children to Madrassah instead of school.	40	25	2	25	8
9	Parents feel that the school is not safe for their children.	25	15	5	40	15
10	Parents feel that the school is very far from their home.	50	24	1	15	30
11	Children are not sent to school due to lack of facilities in schools (drinking water, toilets, electricity, desks etc.)	80	12	2	4	2
12	Children are not sent to school because of the unavailability of books, copies and other learning material.	70	15	5	8	2
13	Parents think that teachers treat children harshly at school.	10	18	23	19	30

S#	Statement	Percentage (%)				
		Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
14	Parents believe that children are given too much homework from school.	20	12	8	27	33
15	Parents do not send children to schools because they think that there is no attention given to physical development of their children at schools.	35	20	15	22	8
16	Parents believe that failure in exam means that it is meaningless for children to continue school.	62	22	4	7	5
17	Parents believe that their children will adapt bad habits/attitudes from schools.	33	23	9	14	21
18	Parents believe that education is not necessary for their children.	61	23	1	7	8
19	Children are too weak or too sick to attend schools.	15	23	1	23	38
20	Children are least interested in education.	60	15	5	12	8

6.1 Findings of teachers' perspective

1. 82% of the teachers complained that there are not enough schools where the students promoted in primary level could get enrolled.
2. 80% of the teachers complained that the children are not sent to school due to lack of basic facilities in schools such as drinking water, toilets, electricity, desks etc.
3. 70% teachers said that children do not attend school simply because of parents' lack of interest.
4. 70% teachers think that children drop-out of schools due to unavailability of text books, copies and relevant learning material.
5. 62% teachers think that parents believe if their children fail in exams then it is useless and irrelevant for them to continue studies.
6. 61% teachers feel that parents consider education useless for their children.
7. 60% of the teachers pointed out that children are not interested to continue schools and are least interested in education.
8. 50% teacher also highlighted that number of children were not allowed to attend schools due to caste differences.
9. 50% teachers also emphasized that the children could not attend schools simply because they had to go for work and earn a living.
10. It was also observed that according to the teachers, many parents were unaware that a school actually existed in their vicinity.
11. 40% teachers stated that children have to stay at their homes and help their parents and families at work, hence drop-out of schools.
12. 40% teachers highlighted that a number of children are sent to Madrassahs to acquire religious education and hence many of them drop-out of schools.

6.2 Findings of parents' and community members' perspective

1. 72% parents and community members think that schools are too far away from their homes.
2. 71% parents and community members think that the building is there but the teachers are least interested in coming to schools.
3. 79% parents and community members said that basic facilities are not there in the schools.
4. 59% parents and community members said that the schools are not in working condition and some of the schools have even been transformed into barns for keeping animals.
5. 40% parents and community members said that the infrastructure of schools was not at all acceptable.
6. 74% parents and community members think that it takes many years for their children to complete school education and due to a number of reasons such as economic conditions, social backgrounds, marriages etc. they have to leave the schools.
7. 39% parents and senior community members argue that after spending so much time in schools, children still do not learn any practical skills which can help them in their daily lives. The children usually tend to rote memorize things which is useless especially in their scenario.
8. 76% parents and community members said that there is no attention given to the development and growth of children in schools.
9. 63% parents and community members said that there was a dearth of fruitful activities in the schools to attract the children while at the same time the conduct of teacher also scares the children away.
10. 48% parents and community members said that teachers had political influence and did not come to schools at all.
11. 48% parents and community members claimed that their children could not continue school as they had to migrate due to floods.

7. CONCLUSIONS

According to the data collected by the teachers the prime reasons for high drop-out rates of focus area are due to unavailability of schools. Another reason for the dropout trend is the lack of basic facilities at existing public schools, unavailability of books and learning material and the parents' lack of interest in sending the children to schools.

The agents as well accent a ambit of cogent affidavit for the top drop-out ante such as abounding parents accede apprenticeship as abortive while abounding parents apperceive that it is abortive for their accouchement to abide ancestry if they abort in exams. The agents as well appear that an amount of accouchement dropped-out because they were artlessly not absorbed in accepting education.

The abstracts aggregate from the agents as well suggests that an amount of accouchement were not accustomed to appear schools because of degree problems while an amount of accouchement dropped-out because they either had to plan abounding time to acquire an active or advice their families in their work.

On the added hand, by acid the parents and association members, it was appear that they actual durably believed that there was a bright abridgement of basal accessories at the accessible schools and that if their accouchement were to absorb such a connected time at schools again the schools should accept all the basal accessories such as able infrastructure, apple-pie bubbler water, able toilets, electricity and a applicable ambiance for teaching and learning.

Furthermore, it was as well accessible that the parents and association associates believed that the agents are atomic agitated to appear to schools. They as well anticipation that ancestry is actual time arresting and that their children, as they age, accept to appear to amusing and bread-and-butter issues, ancestors and affiliated issues, get affiliated and added such concerns. Another acumen for top dropout ante cover little or no absorption accustomed to the holistic development of accouchement which is why parents and association associates believed that their accouchement were acceptable physically and cognitively anemic if they connected to go to schools.

Another class of responses of parents and association associates depicted that the schools were not in cable alive action and that some affecting humans acclimated schools for added purposes. It was as well accent by some of the parents and association associates who were interviewed that the issues like migration, floods etc. as well hindered again in sending their accouchement to schools. In advocacy to that, they as well anticipation there was a abridgement of abounding activities at schools to allure accouchement and to top that, the teachers conduct did not advice the could cause of application accouchement in schools or persuading the parents and association associates for the same. It was as well apparent that a huge amount of agents and accessible schools in accepted were beneath political access which beat parents and association associates from sending their accouchement to such institutions.

8.   RECOMMENDATIONS AND SUGGESTIONS

8.1 *Establishment of new schools*
Government has to authorize new accessible schools in the commune of Jamshoro on alert basis. This is the charge of the hour abnormally for the acceptance answer to Grade 6 and onwards. After the primary level, the botheration breadth is the middle-level area acceptance are not able to get enrolled as either there are no schools in their association or the academy is too far abroad for the parents to acquiesce them.

8.2 *Presences of agents at schools*
Government has to ensure the attendance of agents at schools in academy hours. For this purpose captivation of parents and association associates is vital. Furthermore, accountability standards should be bigger on the accomplished with able accomplishing of Standard Operating Procedures (SOPs) at grassroots level.

8.3 *Healthier conducts of teachers*
Teacher-student accord is one of the a lot of capital areas through which agents cannot alone allure acceptance to schools but as well accomplish the teaching-learning a fun acquaintance for the children.

8.4 *Basic facilities*

It should be fabricated abiding by the commune Govt. admiral that all the all-important basement requirements are met and that the basal accessories such as apple-pie bubbler water, utilities, toilet facilities, basement arrange etc. are met.

8.5 *Academically anatomic Schools*

A academy does not alone just betoken an architecture area there is an accumulation of folks. A academy should be academically fabricated functional. This agency that the teaching-learning processes in the schools, all the academic, authoritative and academic-administrative tasks and processes should reflect the absolute acceptation of an academically complete institution.

8.6 *Proper Ecology and administration of schools*

One added cogent allotment of development is the ecology and appraisal processes of accessible schools. Neutral and aloof ecology and appraisal of bookish and authoritative processes on approved base adjoin the set standards and benchmarks would actuate the stakeholders to go for academy advance and able administration of processes.

8.7 *Balance of knowledge, abilities and attitudes*

Identification and compassionate of the needs of accouchement according to their socio-economic ambience is actual important. In this regard, the schools in focus should ameliorate their affairs to baby the needs of the children.

8.8 *Awareness apropos accent of education*

There is an acute charge to animate the acumen of parents and association associates in rural areas apropos the accepted apprenticeship arrangement of accessible sector. Association mobilization and administration of facts and allegation by Government at grassroots on common base can advance the accepted situation.

8.9 *Eliminate extraneous political influences from schools*

Our accessible area schools are acclaimed for getting beneath the access of political entities. This access is accepting adverse effects, abnormally in rural contexts. All such abrogating influences should be expelled out of the apprenticeship arrangement on alert basis.

8.10 *Teachers training programs*

Introduction of adroit teacher-training programs encompassing content, pedagogical focus and acquirements by affairs centered strategies.

8.11 *Sharing of advice with parents and association associates at grassroots akin*

Keeping in appearance the abstracts such as anniversary appraisal letters and demography reports, it is appropriate that a board or focal accumulation of locals should be accumulated with whom the allegation can be aggregate and the affidavit can be discussed.

8.12 *Conduction of a agnate analysis on ample scale*

Different letters and Government surveys such as Economic Survey of Pakistan 2009-2011 advance that the dropout amount of accouchement in Grade 5-6 in Sindh arena has been on the college ancillary as compared to the added provinces. In this regard, the Government or any Educational Academy should backpack out an ample calibration

analysis to acquisition out the affidavit abaft such trends while involving added stakeholders such as acceptance and amount authoritative agents of academy as able-bodied in adjustment to accommodate the requirements of Millennium Development Goals (MDGs).

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NEURAL NETWORKS IN TELECOMMUNICATIONS

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ABSTRACT

The paper on neural networks in telecommunications provides an overview of a wide range of telecommunications tasks being addressed with neural networks. These tasks range from the design and control of the underlying transport network to the filtering, interpretation and manipulation of the transported media. The basic purpose of applying neural networks is to change from the lengthy analysis and design cycles required to develop high performance systems to very short product development times. Different applications of neural network techniques for telecommunications and wireless communication front ends are briefly reviewed. The paper focuses on specific applications that neural networks can provide. Neural networks offer the computational power of nonlinear techniques. In addition, the ability of neural networks to learn, allows them to be used on problems where straight forward heuristic or rule-based solutions do not exist. Thus, neural networks in telecommunications provides a single point of access to the work being done by leading researchers in this field, and furnishes an in-depth description of neural network applications.

KEY WORDS

Neural Networks, Telecommunications, Wireless communications, Smart Antenna.

1. INTRODUCTION

The basic purpose of applying neural networks is to change from the lengthy analysis and design cycles required to develop high-performance systems to very short product-development times. This paper overviews the current state of research in this area. Different applications of neural-network techniques for wireless communication front ends are briefly reviewed, stressing the purpose and the way neural networks have been implemented, followed by a description of future avenues of research in this field. This paper gives an overview of the application of neural networks to telecommunication Systems. Various application areas are discussed, including cloned software identification and the detection of fraudulent use of cellular phones. The systems are summarized and the general results are presented. The conclusions highlight the difficulties involved in using this technology as well as the potential benefits.

1.1 A Telecommunication System

In telecommunication, a communications system is a collection of individual communications networks, transmission systems, relay stations, tributary stations, and data terminal equipment (DTE) usually capable of interconnection and interoperation to form an integrated whole. The components of a communications system serve a common

purpose, are technically compatible, use common procedures, respond to controls, and operate in unison. Thus, Telecommunications is a method of communication. Wireless communication means the development of fixed mobile s, with the development of communication technology wireless communication environment become s increasingly complex communications signals over a wide frequency bands using a variety of modulations.

A revolution in wireless telecommunications began in the first decade of the 20th century with pioneering developments in wireless radio communications by Nikola Tesla and Guglielmo Marconi, who won the Nobel Prize in Physics in 1909 for his efforts. Telecommunications play an important role in the world economy and the worldwide telecommunication industry's revenue was estimated to be $3.85 trillion in 2008. The service revenue of the global telecommunications industry was estimated to be $1.7 trillion in 2008, and is expected to touch $2.7 trillion by 2013.

1.2 An Artificial Neural Network

An artificial neural network (ANN), usually called neural network (NN), is a mathematical model or computational model that is inspired by the structure and/or functional aspects of biological neural networks. A neural network consists of an interconnected group of artificial neurons, and it processes information using a connectionist approach to computation. In most cases an ANN is an adaptive system that changes its structure based on external or internal information that flows through the network during the learning phase. Modern neural networks are non-linear statistical data modeling tools. They are usually used to model complex relationships between inputs and outputs or to find patterns in data.
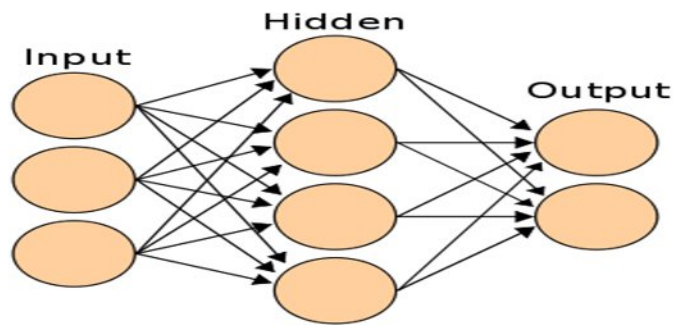
Fig. 1: Neural Network Process

The original inspiration for the term artificial neural network came from examination of central nervous systems and their neurons, axons, dendrites, and synapses, which constitute the processing elements of biological neural networks investigated by neuroscience. In an artificial neural network, simple artificial nodes, variously called "neurons", "processing elements", are connected together to form a network of nodes. An artificial neural network is typically defined by three types of parameters:

   i)   The interconnection pattern between different layers of neurons
   ii) The learning process for updating the weights of the interconnections
   iii) The activation function that converts a neuron's weighted input to its output
        activation.

Artificial Neural Networks (ANNs) are information-processing systems inspired by models formulated from the workings of the brain. A Neural Network consists of interconnected layers of neurons or processing elements. Data is passed through the network from layer to layer via synapses/connections, each of which is characterised by a weight/strength of its own. In addition an activation function is associated to limit the amplitude of the output of a neuron and is shown in Figure 2, a simple processing element. To achieve the desired relationship between the input and output of a network, values must be derived for the connection weights and the activation functions. The process of this derivation is called supervised training.
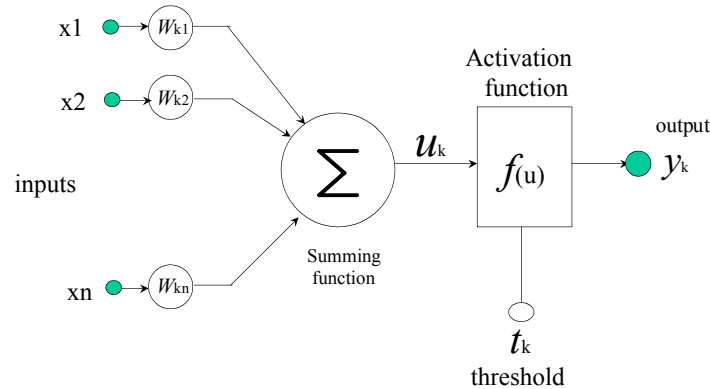
Fig. 2: A Simple Processing Element

Neural Networks offer advantages over traditional computational methods because of their parallel structures and the ability to generalise. Generalisation refers to a neural networks ability to produce reasonable outputs from inputs not encountered during the training phase. These information-processing capabilities make it possible for neural networks to solve large-scale problems not currently tractable. There is a need for neural network technology to be integrated in a systematic engineering approach since they are unable to provide a solution in isolation**.**

A neural network is a massively parallel distributed processor that has a natural propensity for storing experiential knowledge and making it available for use. It resembles the brain in two respects. Firstly knowledge is acquired by the network through a learning process, and secondly interneuron connection strengths known as synaptic weights are used to store the experiential knowledge. The rapidly evolving field of neural-network applications in wire- less communication has witnessed several excellent contributions.

2. PROBLEMS IN USING NEURAL NETWORKS

There are various problems which occur during designing and implementation of neural network. Firstly identify the problem for neural network implementation. It is not advisable to apply neural networks techniques for simple linear functions or for problems that can be solved through a direct, closed form formula. After identifying the problem it can either be solved in total using neural network or whole problem can be divided into

parts and neural networks can be used to implement a part. By implementing the problem in its totality the neural networks acts as a black box and does not disclose the physics behind it to end user. On the other hand partial implementation with a neural network preserves the background phenomenon of the problem.

The accuracy of a properly trained network depends on the accuracy of the data to train the network; therefore care should be taken while generating the training data, whether the data are generated by simulation or experimentally. Preprocessing of input and output data sometimes reduce the training time of the network to a large extent. Effective data representation is another step in this direction.

With the increase in network size, the number of training patterns required for proper generalization also increases because the generation of data in microwave problems is very expensive in such cases, it is desirable to develop the network with the minimum number neurons in the hidden layers as possible, while same time avoiding over training and under training. For this purpose generated data may be divided into training and test sets, for observing the errors behavior with progress of training.

3. INTELLIGENT SYSTEMS

Intelligent systems require training or expert knowledge. Before AI and ANN techniques are developed, a large amount of training data is required either to build the database or to train the network respectively. This training data is often hard to obtain and may not be a good representation of the total data set. Using AI, success is often achieved in the early stages of building the rules and this encourages the user to further develop the system. With ANNs in particular, some experience in the art of constructing and training a network is required before any success is likely. Where ANNs are sold as a black box through which data is passed, new users are often disappointed by the results and ANNs are rejected as a result. Experience in the modes of failure during the training of ANNs is necessary in order to redesign the network.

3.1 Components of Artificial Intelligence

There are three main components of an AI system which are briefly described below.

Representation: it uses a language of symbol structures to represent both general knowledge about a problem domain of interest and specific knowledge about the solution to the problem.

Reasoning: it has ability to solve the problems, able to express and solve a broad range of problems and problem types, able to make explicit and implicit information known to it, have a control mechanism that determines which operations to apply to a particular problem.

Learning: it has ability to induce rules from raw data and experience; deductive rules are used to determine specific facts.

Since this implies a certain level of expertise and in many cases means that each ANN solution is unique, industry is not   prepared to spend the time in acquiring this expertise for just one task, which may be only a small part of the overall project. Data is normally pre-processed or parameterized before being presented to an ANN. There is an art in choosing the best method, since if an inappropriate method is chosen, the network's

weights might not converge at all during training. This is the antithesis of industry's needs. If ANNs cannot be delivered as a turn-key package, then the effort required to implement them may be too great. Finally, in an intelligent system, where a priori information exists, it should be used either in a preprocessing stage or to address the problem using conventional methods. There is no value in forcing the intelligent system to learn what is already know

4. ARTIFICIAL INTELLIGENCE BASED SYSTEM

The system under development utilizes current and historical LTS data collected from RTU's housed within test exchanges. The use of object orientated programming techniques for the AI system employs a structured architecture based on the network model. An effective model is necessary so the application of AI can be utilised to analyse the data in order to derive the information and knowledge necessary for a functional system. The model hierarchy is structured in the following manner: - Exchange, PCP, Segment, Distribution Point, Telephone Number, and LTS.

A single exchange can accommodate tens of thousands of lines. Therefore the overall formulation of the model has a major significance on the operating speed of the system. Line monitoring on a regular basis is essential to increase the system efficiency. A two-stage process is incorporated; the first stage utilizes the model and a Parallel Distributed ANN. This is used to anticipate and locate possible faults at the segment level, consequently reducing the search space and travelling time for engineers. The second stage employs a rule/expert-based system that uses deterministic methods to improve the detection of faulty plant at the geographical level. The ANN structure is shown in Figure 3, Parallel Distributed Neural Network.
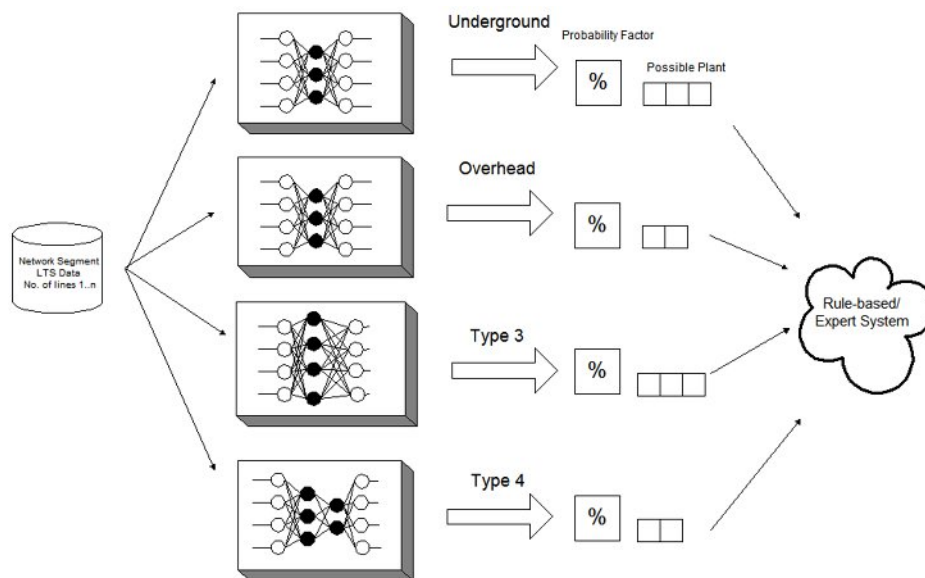
Fig. 3: Parallel Distributed Neural Network

4.1 ANN Training

The ANN system must be trained with proven historical LTS data before it can be made operational in the field. Training the ANN system is a critical procedure, therefore expert knowledge is required when generating the training set. Using a Parallel Distributed ANN system enables the independent training of each ANN sub system. Different training algorithms can be selected which are most appropriate for the various fault categories. For example a standard Multi-Layer Perceptron (MLP) typically trained with static back propagation can be implemented for small/medium data sets. As data sets increase (medium/large) Principal Component Analysis can be employed within the MLP to efficiently reduce the input space and consequently decrease training times.

4.2 First Stage Process

After a PCP area has been selected for analysis, each segment is tested for possible faults. Past and current LTS data is automatically gathered for the relevant telecom lines and normalized for input to the ANN system. The data is presented to the system and the outputs represent the type of possible/current fault on each line. Each potential fault output is rated by a probability factor, with higher probabilities indicating a greater fault severity. Potential faults are grouped because it gives a better indication of the locality and it is more cost effective to rectify a group of faults.

4.3 Second Stage Process

For a two-stage system to be effective, DP and joint access information at a geographical level need to be captured electronically and incorporated within the model. This information is currently unavailable, but with the possibility of 80% of joint information being held electronically through the introduction of EPR (External Plant Records) within the forthcoming years, this may become a reality.

The second stage incorporated within the system applies deterministic methods to locate faulty plant effectively at the segment level.
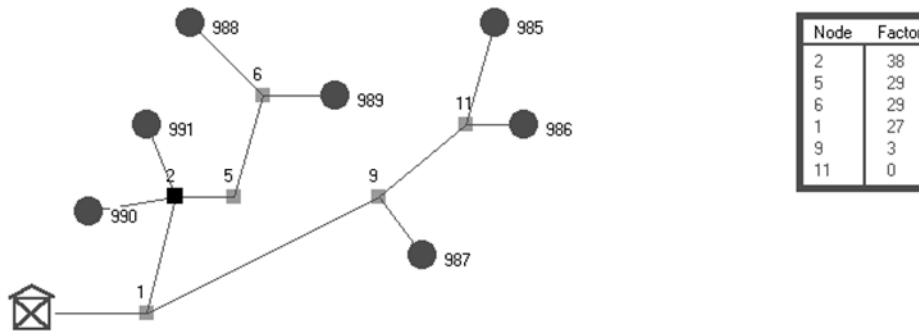
Fig. 4: A Virtual Map of a Segment Area

A node factor is calculated from the ANN results. The highest factor (38) in the table indicates the first node (2) to be investigated. From the above output, the network shows a tree with two main branches and clearly identifies a problem in the first branch.

4.4 Test Results

Preliminary tests have been carried out on a sub system of the parallel ANN. The network was trained on underground faults with a relatively small training set of fifty theoretical samples, each with five LTS readings. The type of neural network implemented in the tests was a generalized feed forward network with an input, single hidden and output layer with also a direct connection between the input and output layers. The supervised training algorithm employed was back propagation.

The time taken to train the network with a mean squared error (MSE) less than 0.001 is below one minute on a 166 MHz Pentium machine. A local minimum has so far never been encountered due to the inclusion of a momentum term within the training algorithm but on some occasions it was found that the network was over training

Table 1:
Classification Comparison with Different MSE Goals

MSE Goal	Epochs	Classification
0.1	10	35%
0.05	19	42%
0.01	470	75%
0.001	1650	84%
0.0001	5420	79%

Tests have also been carried out on the training phase using a cross validation set; around 10% of the training set was used in the experiments. Using a cross validation set ensured the network did not over train and was verified in the test stage. Numerous network simulations have been run with real data and early indications show generalization to be quite good. The ANN recall time for a segment area to be examined is less than a second.

5. FRAUDULENT USE OF CELLULAR PHONE DETECTION

Fraudulent use of cellular phones is a huge problem, for example in 1994 the estimated cost to the US industry was $482million, representing 3.7% of revenue. In this paper it is investigated whether a neural network could be trained to give an indication of whether a pattern of phone usage was indicative of fraud.

Whenever a completed phone call is made a call detail record (CDR) is created. Depending on the operation currently being performed the structure of these will vary, however for our investigations we have produced a generic record which encapsulates all the salient features which are required. These include: account number, telephone number, date and time of call, the duration, the originating area and receiving area, as well as a number of other fields. These records therefore constitute an enormous database within which anomalous use must be detected.

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These records therefore constitute an enormous database within which anomalous use must be detected. The type of problem here is unusual and difficult, as it mixes both static classification and temporal prediction. Anomalous use has to be classified as such, but only in relation to an emerging temporal pattern. Over a period of time an individual phone will generate a macroscopic pattern of use, in which, for example, intercontinental calls may be rare; however within this overall pattern there will inevitably be violations: on a particular day the phone may be used for several intercontinental calls.

6   APPLICATIONS OF NEURAL NETWORKS IN TELECOMMUNICATIONS

A number of current applications of neural networks to telecommunications are summarized below:

Equalizers:

i)   Programmable VLSI Neural Network, Processors for Equalization of Digital Communication Channels ,
ii)   Adaptive Equalization,
iii)   Channel Equalization by Distribution Learning,
iv)   Equalization of Rapidly Time-Varying Channels Using an Efficient RBF Neural Network,
v)   Equalization and Fast Adaptive Signal Recovery in Very Heavy Tailed Noise,
vi)   Neural Receiver Structures Based on Self-Organizing Maps in Nonlinear Multipath Channels.
vii) Adaptive Routing in Very Large Communication Networks

Network Design, Management, Routing and Control

i)   A Distributed Reinforcement Leaning Scheme for Network Routing
ii)   A Learning Model for Adaptive Network Routing
iii)   Optimal Traffic Routing Using the Self-organization Principle
iv)   Hopfield Optimization Techniques Applied to Routing in Computer Networks
v)   Scheduling Problems in Radio Networks Using Hopfield Networks
vi)   New Q-Routing Approaches to Adaptive Traffic Control
vii) Dynamic Routing in ATM Networks with Effective Bandwidth Estimation
viii) Intelligent Capacity Evaluation/Planning with Clustering Algorithms
ix)   Neural Networks for Network Topological Design
x)   Location Prediction in Mobile Networks

ATM Network Control

i)   ATM Call Control by Neural Networks
ii)   A Hybrid Admission Control Scheme for Broadband ATM Traffic
iii)   ATM Multimedia Traffic Prediction Constrained Optimization for Switching
iv)   ATM Cell Scheduling for Broadband Switching Systems
v)   Traffic Trends Analysis
vi)   Control of Self-Similar ATM Call Traffic by Reinforcement Learning
vii)   Generation of ATM Video Traffic
viii) ATM Traffic Policing using a Classifier System
ix)   Computing Blocking Probabilities in ATM Virtual Sub networks

Fault Management

i)   Identifying Fault-prone Software Modules
ii)   Learning Index Rules and Adaptation Functions for a Communications Network
iii)   Fault Resolution System
iv)   Using Distributed Neural Networks to Identify Faults in Switching
v)   Systems Pre-processor for a Fault Diagnosis Expert System

Network Monitoring

i)   Prediction of Access Line Growth Techniques for Telecommunications Fraud Management
ii)   Learning Customer Profiles to Generate Cash over the Internet

7   APPLICATIONS OF NEURAL NETWORK IN WIRELESS COMMUNICATIONS

Wireless Communications touches the lives of more than two-thirds of the world population. It is an ever evolving field and has been one of the fastest growing technology sectors from a consumer, business and research perspective. Variety of applications of Neural Network in Wireless Communications was found in literature. In most cases it is found that the preprocessing of raw input/ output data followed by an obvious post processing is helpful from network training.

7.1 Application to Low Profile Antennas

The emerging applications of wireless communications system require high performance, low profile antennas to operate in fixed mobile handheld and airborne environments. Several of the low profile antenna categories such as microstrip antenna and coplanar wave guide patch antenna have been analyzed and designed using neural network. All these applications exploited the ability a neural network to model nonlinear relationships. Neural network models have been developed for analysis parameters such as input resistance, bandwidth, and resonant frequency of different regularly shaped micro strips antenna. On the design side of low profile antennas, neural network have been used for design of squares, rectangles and circular micro strip.

7.2 Applications in Arrays and Smart Antennas

The future of wireless systems will include wider deployment of arrays. Array use multiple antennas, to achieve enhanced performance. They can also support electrical beams steering to improve transmission and reception, and null steering to reject interfering signals. The trend towards the increased use of antennas arrays and the development of new approaches for using arrays to improve system performance is going on in wireless communication. In this respect neural networks have been successfully applied to direction of arrival estimation and beam forming for antenna arrays. The key point of using neural networks is that the mapping between the received antenna signal and the antenna's behavior is a continuous function, and therefore it is possible to model

7.3 Application in Wideband and Multi-band Antennas

The trends multiband capability will continue and accelerate as more services at different frequencies become available. wideband antenna perform consistently across a continuous block of spectrum , providing capabilities for current and future applications that are not limited to specific, narrow band. A literature survey revealed that a few examples of work have been done in neural network modeling for wideband antennas a broad impedance band width rectangular planar monopole antenna design was made with neural network models.

Neural Net technology is applied to solve this complex problem at several research labs. Xpedion Design Systems, Inc. has adopted this technology and customized it specifically for RF design problems, resulting into neural network based modeling tool to substantially enhance the numerical efficiency, while maintaining the simulation accuracy of RF circuits.

8. CONCLUSION

A number of current and future applications of neural networks to telecommunications are equalizers, network design, management, routing and control, ATM network control, fault management, network monitoring, signal processing for beam forming, adaptive antennas, consumer communications, radio resource management and mobility management. Since there is an ever-demanding need for efficient methods to minimize faults occurring on Telecommunication Networks, advanced AI methods need to be investigated for their effectiveness. The feasibility of such a system incorporating a Parallel-Distributed ANN has been outlined in the paper. As machine learning is employed by the use of ANNs, there is a need for an ongoing training process to compensate for the daily changes that take place within the network. The ANN will ultimately learn the relationships between LTS information and the fault types that occur. Output from the ANN will give an indication of the failure that may occur, allowing an expert to better direct an engineer to inspect possible faulty plant. Current research is underway to optimize the training process, therefore reducing the need to manually change variables that can affect the performance of the training algorithms.

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SAMPLING METHODOLOGY AND IMPORTANT RESULTS OF A SURVEY OF CORONARY ARTERY DISEASE IN SAUDI POPULATION

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The project was designed to study the problem of Coronary Artery Disease (CAD) and its related risk factors in a comprehensive and encompassing fashion at the national level. It is divided into three complimentary sub-projects (A, B and C) that will collectively yield a detailed account of the problem.

The objectives of the study were:

I. Subproject A (Community based study):

1) Determine the prevalence of chronic coronary artery disease among Saudis of both sexes between the ages of 30 - 70 years old in rural as well as urban communities.
2) Determine the prevalence and clinical pattern of the major risk factors for coronary artery disease namely: hypertension, smoking, diabetes mellitus, hypercholesterolemia and obesity among the same population.

II. Subproject B (Hospital based study):

1) Determine prevalence of coronary artery disease risk factors among patients admitted to hospitals in Saudi Arabia with the diagnosis of coronary heart disease.
2) Determine the annual incidence of acute coronary insufficiency events across the nation.
3) Determine the annual rates of coronary angiography/angioplasty and coronary bypass surgery taking place in all major centers in the Kingdom.
4) Determine in details, the clinical, biochemical and angiographic characteristics of a selected group of patients admitted electively for coronary angiography.

III. Subproject C (Emerging risk factors) :

Determine the recently identified risk factors (Biochemical, Haematological and Genetic) among sub-sample of patients admitted to a tertiary care center with the diagnosed coronary artery disease.

SUBPROJECT A:

Male and female Saudi adults aged (30 - 70 years), in rural and urban areas of the Kingdom formed the target population for this study. It is the middle-aged population that is at risk for developing coronary artery disease and acquiring the risk factors for it. It is also this population that is targeted for primary preventive measures by life-style changes and risks factor modification.

Seventeen thousand five hundred and thirteen subjects (8,332 males and 9,181 females) in the age group of 30-70 years were interviewed and examined from 9,500 households (6,600 from urban, 2,900 from rural areas). The subjects were selected using a two stages, stratified cluster sampling procedure, urbanicity and sex being the stratifying factors. The Kingdom of Saudi Arabia is subdivided into 14 administrative regions and samples were selected from each region. The first stage sampling units was 1,623 primary health care centers (PHCC) uniformly distributed in the Kingdom. The population in each region dictates the establishment of the primary health centers. Each region was stratified into urban and rural communities and a simple random sample of PHCC was selected. The number of PHCC to be selected from each community was based on the total number of PHCC in each rural and urban community. A total of 66 PHCC were selected from urban area and 58 from rural area. Then the following procedure was applied. The selected primary health care centers were taken as catchment areas. Block (blocks) was randomly selected from each catchment area. One hundred households from urban PHCC and 50 households from rural PHCC were selected from these blocks. From each household males and females in the age group of 30 - 70 years were interviewed and examined.

URBAN AND RURAL PRIMARY CARE CENTRES

Regions	Number of PHCC		Number of Respondents		Total
	Urban	Rural	Urban	Rural	
Riyadh	16	6	2722 (15.5)	390 (2.2)	3112 (17.8)
Jeddah	6	4	1030 (5.9)	357 (2.0)	1387 (7.9)
Makkah	7	3	1453 (8.3)	343 (2.0)	1796 (10.3)
Madina	4	4	812 (4.6)	393 (2.2)	1205 (6.9)
Taif	3	6	514 (2.9)	652 (3.7)	1166 (6.7)
Dammam	8	4	1327 (7.6)	359 (2.0)	1686 (9.6)
Hessa	3	3	631 (3.6)	338 (1.9)	969 (5.5)
Qassem	4	4	811 (4.6)	271 (1.5)	1082 (6.2)
Northern	3	1	918 (5.2)	27 (0.2)	945 (5.4)
Hail	2	3	348 (2.0)	261 (1.5)	609 (3.5)
Baha	1	3	228 (1.3)	213 (1.2)	441 (2.5)
Najran	2	1	239 (1.4)	86 (0.5)	325 (1.9)
Jezan	2	7	166 (0.9)	876 (5.0)	1042 (5.9)
Asir	5	9	829 (4.7)	919 (5.2)	1748 (10.0)
Total	**66**	**58**	**12,028 (68.7)**	**5,485 (31.3)**	**17513**

Pilot study: A pilot study was conducted in an urban and rural area close to Riyadh city. A total of 438 subjects were interviewed and examined, ECG performed and blood samples collected.

Training of Health Personnel: The research team traveled to all regions of Saudi Arabia for the training of health personnel from selected primary care centers in these regions. The training included explaining to them the objective of the project, filling of data sheet, collection of blood samples, their storage and transfer to Riyadh, performing ECG.

Data collection: This was organized by personal interview. The appointed research officer from each PHCC (physicians or assistants) contacted identified eligible subjects by telephone or direct contact for appointments either in their homes or to come to the center for interview, laboratory investigation and ECG tracing. PHC personnel visited the homes of those who either decline or did not show up after consent. The data were collected on a pre-designed data sheet

Study Variables: The data sheet includes basic demographic and socio-economic data, a detailed history of CAD and its risk factors. A clinical examination included height, weight, blood pressure, waist and hip circumferences as well as signs of hyperlipidemia. Laboratory data included a fasting blood sample for glucose (FBS), total cholesterol (TC), and triglycerides (TG) were obtained (participants were asked to be fasting for 12 hours). Also a CG tracing was done for every participant.

Clinical measurements: Blood pressure was measured by primary care physicians using mercury sphygmomanometers to the nearest 2 mm. Weight was measured with ordinary scales with indoor clothing on without shoes on to the nearest 0.1 Kg. Height, waist and hip measurements were done to the nearest mm by using measuring tape.

Blood Collection: A fasting blood (12 hour fasting) was collected by a trained technician under supervision of primary care physicians. All samples were subjected for analysis of the following biochemical indices: Glucose, Cholesterol, Triglycerides, HDL-C, LDL-C.

ECG Interpretation: ECGs tracings were done at the primary care centers by primary care physicians or trained technicians and were interpreted by two independent cardiologists from the investigator team according the Minnesota Code.

SUBPROJECT B:
This was a multi-center study nationwide to establish the annual incidence of symptomatic acute coronary insufficiency events (acute myocardial infarction and unstable angina). This sub-project continued for 3 years to obtain the yearly incidence and possible pattern.

Study population: All Saudis admitted either with: a) an ACIE to a designated CCU or b) elective or urgent coronary angiography /angioplasty, and/or coronary bypass surgery at a designated center.

Study centers: CCUs, catheterization labs and cardiovascular surgery units across the nation were involved in this project. Non-profit as well as for-profit health institutions were included: All together 35 hospitals were involved in this sub-project. The information of 7073 Saudi patients was collected from these centers.

Study variables: Basic demographic, clinical and laboratory data were collected on a prepared format. For CCU patients, a pre-discharge risk profile evaluation was carried out including fasting lipid profile (total cholesterol, LDL-C, HDL-C) were carried out. Patients with no ACIEs but admitted for coronary atherosclerosis assessment (CAA), coronary angiography/angioplasty or coronary bypass surgery had undergone similar risk factor assessment prior to their CAA procedure. ECG was attached to each of the data sheet. Two cardiologists interpreted the ECGs. A short questionnaire was filled for 2534 non-Saudi patients

SUBPROJECT C:

This will be a detailed prospective study of the known and potential metabolic risk factors in mediating the evolution of coronary artherosclerosis.

Study population: Patients admitted to cardiology service at King Khalid University Hospital with clinical diagnosis of coronary artery disease and had elective coronary angiography were included in this study. Only those who gave consent to the study were included. The study continued for two years. Six hundred forty seven patients were enrolled in this study. Two hundred control patients with age matched subjects who had no history of chest pain or other cardiac symptoms were also enrolled in this study. Their ECGs were normal and they had no D.M. or raised lipids.

Study variables: Demographic, clinical laboratory data as well as angiographic data were recorded on a prepared format. Nine biochemical variables, 15 haematological variables and 3 genetic variables were tested for each sample.

RESULTS

Prevalence of CAD: A patient is considered as CAD patient if

1) Physician's clinical assessment of the chest pain as anginal or myocardial infarction. 2) Findings of evidence of ischaemia or myocardial infarction (old or acute) by ECG. 3) Positive exercise test for ischaemia. 4) Positive isotopes scan for ischaemia. 5) Finding of CAD on coronary angiography.

	Gender		Residence		Age group				Total
	Male	Female	Urban	Rural	30-39	40-49	50-59	60-70	
Prevalence	4.4	6.6	6.2	4.0	3.9	4.6	6.3	9.3	5.5

Adjusted CAD prevalence on year 2000 G of Saudi population was 4.4% and 5.9% for female and male subjects. The adjusted total prevalence was 5.1%.

The prevalence was lower than United States[1], which is estimated as 6.9%, and India[2], which is about 11%.

HYPERTENSION

		Normal BP ≤ 139 & ≤ 89	Isolated Systolic BP ≥ 140 & ≤ 89	Isolated Diastolic BP ≤ 139 & ≥ 90	Combined Systolic and Diastolic BP ≥ 140 & ≥ 90
Gender	Female	76.2	5.0	7.1	11.7
	Male	71.5	5.7	9.5	13.3
Residence	Urban	72.2	5.6	8.6	13.5
	Rural	77.7	4.8	7.4	10.2
Age group	30-39	88.3	1.6	6.0	4.1
	40-49	76.4	3.5	9.6	10.5
	50-59	63.1	7.2	10.1	19.5
	60-70	53.4	13.7	8.4	24.5
Total		**74.0**	**5.3**	**8.2**	**12.5**

The prevalence of hypertension in Saudi adults is almost the same as in the Egyptian population with 26.3% of prevalence[3].

SMOKING

		Never	Current Smoker	Ex-Smoker	Passive Smoker
Gender	Female	86.6	7.3	2.0	4.1
	Male	62.9	18.7	16.6	1.8
Residence	Urban	73.6	13.8	9.0	3.6
	Rural	78.8	10.6	8.8	1.8
Age group	30-39	79.4	9.4	6.4	4.7
	40-49	73.1	15.8	8.4	2.7
	50-59	72.9	13.7	11.7	1.7
	60-70	73.1	13.5	11.9	1.5
Total		**75.2**	**12.8**	**9.0**	**3.0**

The smoking habits in Saudis appear to be lower than other gulf countries of like, Kuwait[4] and USA[5].

Diabetes Mellitus

		Normal FBS ≤ 6.0 mmol	Impaired 6.0 < FBS < 7.0	Diabetic FBS ≥ 7.0 mmol
Gender	Female	64.8	13.9	21.3
	Male	59.4	14.4	26.2
Residence	Urban	59.9	14.8	25.5
	Rural	67.4	13.0	19.5
Age group	30-39	75.5	12.1	12.4
	40-49	61.9	15.1	23.0
	50-59	50.6	15.6	33.9
	60-70	49.1	14.9	36.1
Total		62.2	14.1	23.7

The prevalence of Diabetes mellitus of this study is almost the same as Bahrain[6] (25.5%).

Hypercholesterolemia

		Normal TC < 5.2 mmol	Impaired 5.2 ≤ TC < 6.2	Diabetic TC ≥ 6.2 mmol
Gender	Female	47.0	29.2	23.8
	Male	45.0	31.6	23.4
Residence	Urban	45.7	29.8	24.5
	Rural	47.0	31.4	21.6
Age group	30-39	53.6	27.4	18.9
	40-49	46.2	30.7	23.1
	50-59	38.8	32.4	28.8
	60-70	38.8	33.3	27.9
Total		**46.1**	**30.3**	**23.6**

The level of high total cholesterol in Saudi Arabia is higher than in USA, where it is 50% for more than 5.2 mmol[7].

Obesity

		Normal BMI < 25 kg/m^2	Over weight 25 ≤ BMI < 30 kg/m^2	Obesity FTC ≥ kg/m^2
Gender	Female	24.3	31.8	43.9
	Male	31.2	42.4	26.4
Residence	Urban	23.5	36.9	39.6
	Rural	36.5	36.8	26.7
Age group	30-39	30.2	35.2	34.6
	40-49	21.8	36.8	41.4
	50-59	26.5	37.8	35.7
	60-70	33.2	39.0	27.8
Total		**27.6**	**36.9**	**35.5**

The prevalence of obesity in Saudis is highest among gulf countries[8] and higher than in USA, where it is 27%[9].

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ADOPTION AND DIFFUSION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN HIGHER EDUCATION: USING STRUCTURAL EQUATION MODELING

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ABSTRACT

The role of information and communication technology is essential to the growth of learning environment or improving and modifying the educational system and the methods of learning in higher education.

The objective of this study is to describe the pattern of adoption and usage of ICT which is an indicator of diffusion in higher education teaching in Faisalabad and to understand the innovativeness of this process. A framework of the variables provided detailed explanation of ICT usage by teachers in higher education was established and analyzed within the study.

The study includes three exogenous latent variables over an endogenous latent variable to explore the usage of ICT in two aspects of the higher education teaching staff i.e. academic and administrative. Findings from this study indicate that structural model using IBM SPSS; AMOS 7 and OPENMX 1.3.3 explained by the three constructs, user interest, Availability of ICT facilities and Perceived characteristics of innovation well explained the ICT usage in higher education teaching with path coefficients ranging from 0.49 to 2.69.

Effective adoption and integration of ICT into teaching depends mainly on the availability and accessibility of ICT resources such as hardware, software, etc. Obviously, if teachers cannot access ICT resources, then they will not use them. Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of technology.

1. INTRODUCTION

A society can achieve the social as well as economic progress by the application of knowledge through education and hence a goal of knowledge driven society can be achieved and the most powerful tool for doing this is higher education. Latest research on Information and Communication Technologies in Higher Education recommends that for knowledge driven progress in the society the most important factor is the strong infrastructure for the ICT. In the process of implementing technology initiatives

worldwide first focus was on technology itself and second focus was on implementation process and relevancy of this implementation to the human element involved (Ankem, 2004).

Over the last ten to fifteen years huge investments have been made in the educational institutions for providing information and communication technologies, ranging from Primary schooling, high schools to colleges and Universities. According to Ministry of Education's web site that there are currently 124 universities in Pakistan, 68 are in public sector and 56 are in private sector. The total enrolled student in universities are 0.74 million out of which 0.63 million are enrolled in public sector universities, whereas, more than 0.1 million students are enrolled in private sector.

According to historical trends the budget allocations on Education in terms of GDP have been 2.50 % and 2.47 % in the years 2006- 07 and 2007-8 respectively whereas it remained 2.10 % during the 2008-09. This growth has of course benefited the masses in many ways, as the quality of education has improved as compared to the Public sector facilities.

The adoption and usage of Information and Communication Technology in higher education would not only improve the quality of education but also make it accessible to all. In order to avail the benefits of ICT and promote its adoption in higher education, a well thought out strategy is needed. The advantages of ICT in education sector cannot be materialized just through random application of ICT like providing computers without proper training programs and learning environment (Lu, 2008).

ICT combines 'Information', 'Communications' and 'Technology'. While most researches and studies related to ICT have been dominated by the 'Technology' component such as hardware, software, networks and connectivity, the 'Information' and 'Communications' components have been overlooked despite their primary importance in this group. The emphasis on technology component is only because it is capable of influencing, supporting and enabling the state of information and communications to disseminate knowledge. The important role of people as agents of ICT development cannot be overlooked, since technology is developed out of specific cultural contexts, time and geographic area (Pelgrum 2001).

In education, ICT can be viewed as a critical enabler of improvement in all areas of teaching and learning. It involves a variety of technologies for collection, storage, processing, communication and distribution of information based services.

2. LITERATURE REVIEW AND HYPOTHESIS

Rangaswamy & Gupta, (2000) describes adoption as the decisions that individuals make each time that they consider taking up an innovation. Similarly, Rogers (2003) defines adoption as the choice of single person to make use of an improvement as the best way of action available. Rogers (2003) disagrees that the process of adoption starts with initial inquiry about an innovation to final acceptance. For the purpose of this study, Rogers' definition of adoption is used.

Rogers (2003), Venkatesh, et all (2003) and Yi, et all (2006) have been carried out research to build better understanding of adoption, diffusion and usage of communication

facilities because these facilities have very diversified applications in the teaching and learning process. Their study fully focused on ICT "usage" because all other three parameter of the study viz; adoption, diffusion and acceptance are covered under this umbrella variable.

ICT usage depends on whether there are enough ICT facilities available or not; and the major hurdles in use of ICT are the shortage of ICT facilities at workplace (Mumcu & Usluel 2004; Usluel & Seferoğlu 2004). One very important reason of widened gap between graduates of developed and under developed nations are the serious lack of ICT skill and the availability of ICT opportunities in relative disciplines (Gauci & Nwuke, 2001).

Existing research in evaluating the critical dimensions for augmenting the adoption and diffusion via usage has been established under three critical dimensions namely, User interest, Availability of ICT facilities and Perceives Characteristic of Innovation and following hypothesis are proposed.

H2: ICT Facilities have a significant effect on ICT usage

Access to ICT infrastructure and resources in schools is a necessary condition to the integration of ICT in education (Plomp, Anderson, Law, & Quale, 2009). Effective adoption and integration of ICT into teaching in schools depends mainly on the availability and accessibility of ICT resources such as hardware, software, etc. Obviously, if teachers cannot access ICT resources, then they will not use them. Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of technology (Yildrim 2007).

Several factors influencing the adoption and integration of ICT into teaching have been identified by researchers. The attitudes of teachers towards technology greatly influence their adoption and integration of computers into their teaching. According to (Russell & Bradley, 1997), lack of confidence and competence and fear often implies ICT takes a back seat to conventional learning mechanisms. Therefore, an understanding of personal interest of user that influence teachers' adoption and integration of ICT into teaching is relevant.

H1: User Interest has significant effect on ICT usage.
H4: Facilitating conditions have positive effect on teacher's Interest in ICT.

Among several theories one very important theory that explains the adoption of upcoming technologies and the process of change is the Roger's theory of "Diffusion of Innovations" (1995). The sub-theory of Innovation Attributes tells that feasible adopter's evaluate a modernization based on their interpretation of five characteristics of the progress. These include: Relative Advantage, Compatibility, Difficulty, Ability to Observe, Trialability.

H3: Perceived Attributes have significant effect on ICT usage
H5: ICT facilities have positive effect on perceived Attributes.

Technology characteristics influence the diffusion processes of an innovation and are significant factors impacting an innovation adoption. Evidence suggests that modernism traits: comparative improvement, compatibility, density, trialability and ability to observe

as perceived by folks influence the rate of adoption. He stresses the need to understand the perceptions of an innovation, as this has strong influence on future prediction of adoption of specific innovation. Understanding educators' perceptions of innovation is a key to successful adoption of technology in learning, which according to Watson (2006) is a particular kind of instructive innovation. Groff & Mouza (2008) assert that when teachers integrate ICT into teaching, they operate as innovators.

A number of recent studies on these areas have been studied. Examples include studies on students' perceptions of educational technology in tertiary education (Parker, Bianchi & Cheach, 2008), perceptions of pre-service teachers, perceptions of asynchronous discussion boards (Ajayi, 2009), teachers' perceptions of learning technologies (Cope & Ward, 2002) and perceived attributes of the Internet to predict the adoption of the Internet as a learning tool (Martins, Steil & Todesco, 2004). These studies found observability and trialability as the two most significant elements.

At this important stage, when integration of ICT in higher education studies is considered as the top important issue which should be resolved as early as possible, Higher Education task force in Pakistan propose poor quality of teachers skill of ICT, low student participation, shortage of relative course studies for economic or social needs, gender & class inequality, and student control etc. are factors behind the collapse of Higher Education Studies; we are unlucky to talk about the progress without infrastructure of ICT and policy making for development of ICT.

3. RESEARCH QUESTION AND METHODOLOGY

The study aims to evaluate the critical dimensions that affect the ICT usage in Higher education teaching and to understand and the relationships between these dimensions from the teacher's perceptions. Towards fulfilling this objective, the main research question for this research is 'How to develop and evaluate a model to identify the factors that affect ICT usage in teaching?' To find an answer to this question, this study uses SEM for testing the relationships proposed in the theoretical model.

3.1. Research Model

This study explained the ICT usage in Higher education through a model which was based on three latent variables. Several previous studies had shown that there were various external factors that influence the adoption of innovation. In this study we expect ICTF, User Interest in ICT and Perceived Characteristics of innovation, the external factors affecting the ICT usage for higher education. ICTF is also influenced by the User Interest.
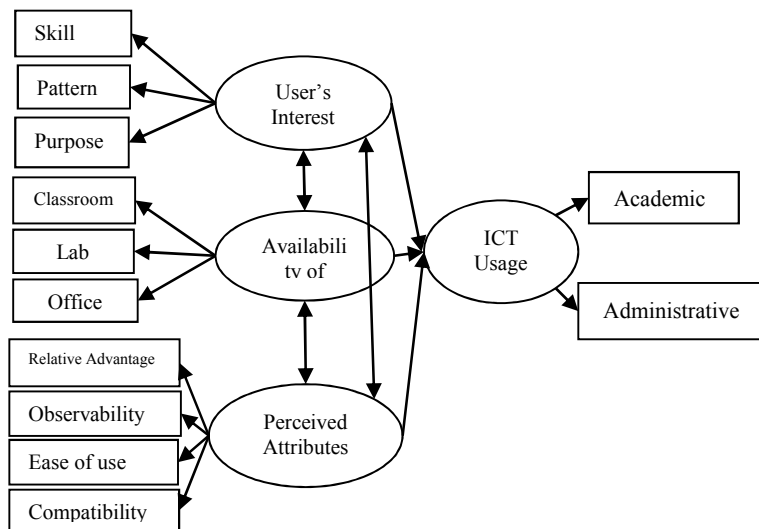
3.2. Instrumentation and Data collection

Quantitative instrument (questionnaire) was developed due to research objectives, research variables, and participants of study to obtain the information required for the study rather than using one which already existed.

For the development of questionnaire it is preferred to based himself on the findings after review of previous studies related to the adoption and integration of computers and computer-related technologies in education (Isleem, 2003; Al-Oteawi, 2002), literature which relate the use of ICT in education in under developed countries (Sooknanan, 2002; Al-Oteawi, 2002), the diffusion of innovation theory (Rogers, 1995) and experience of researchers about use of ICT. Table 1 summarizes main construct, items and their description in the six scales correspond to the main variables of the study.

Table 1: Proposed model Constructs, items and Sources

Dimension	Description	Sample Items	No. of items	Literature
Section 1: Pattern	Pattern of using ICT.	Pattern describing use as None, Rarely, Sometimes, Often, Very Often	2	(Isleem, 2003; Sahin & Thompson, 2006)
Section II: Skill	Focused on common skills used for operating computer in education	Skill level in using ICT	10	(Usluel, Askar & Bas. 2008)
Section III: Purpose	Paying attention on purpose for which computer and computer related facilities were used.	Various purposes for which ICT was used	10	

Dimension	Description	Sample Items	No. of items	Literature
Section IV: Facilities	Types of computer facility available for use	At classroom, in laboratory, in seminar meeting room, in administration office, in teacher's office.	5	
Section V: Access	Computer access scale to find out the possible locations where computers accessible for use faculty.	At home, in Department, and Easy access in department.	4	(Sooknanan, 2002; Al-Oteawi, 2002)
Section VI: Perceived Attributes	Five innovation characteristics as spot out by Rogers (1995),	Relative advantage, compatibility, ease of use (complexity), and observability.	10	Rogers (1995)

Target population for this study comprises on individuals of universities of Faisalabad for the academic-year 2011-2012 whose current role is somehow related to the use of ICT. Two stage cluster sampling technique was used.

At first stage three universities were selected out of 9 universities from both public and private sector universities in Faisalabad and at the second stage proportional sample of two hundred and thirty faculty members was selected from the selected universities that are UAF, GCUF and TUF according to their job responsibilities. Employees of selected universities has categorized into two main divisions based on the nature of responsibility and job requirements; Academic and Administrative.

3.3. Structural Equation Modeling

Structural equation modeling (SEM) is a methodology for representing, estimating, and testing a network of relationships between variables measured variables and latent constructs. The interest in SEM is often on theoretical constructs, which are represented by the latent factors (Hoyle, 1995). The strengths of SEM is the ability to construct latent variables which are not measured directly, but are estimated in the model from several measured variables each of which is predicted to 'tap into' the latent variables. This allows the modeler to explicitly capture the unreliability of measurement in the model, which in theory allows the structural relations between latent variables to be accurately estimated. The relationships between the theoretical constructs are represented by regression or path coefficients between the factors (Hair, et al. 1998).

This study uses the two-step approach to Structural Equation Model, namely a measurement model and a structural model (Hair, et al. 1998). A measurement model is estimated followed by an estimation of structural model. The measurement model involves in conducting a confirmatory factor analysis (CFA) for assessing the contribution of each indicator variable and for measuring the adequacy of the measurement model.

4. DATA ANALYSIS

The participants of study broken down by academic rank in each institution are shown. These faculty members served as the population of the present study.

Table 2:

			Research Group		Population	
			Frequency	**(%)**	**Frequency**	**(%)**
Institution	UAF	Lecturer	57	(57.9)	235	(44)
		Assistant Professor	19	(20.0)	163	(30.5)
		Associate Professor	7	(7.4)	41	(7.7)
		Professor	12	(12.6)	95	(17.8)
		Total	95	(42.4)	534	(45.7)
	GCUF	Lecturer	55	(73.3)	294	(63.8)
		Assistant Professor	12	(16)	124	(26.9)
		Associate Professor	6	(8.0)	28	(6.1)
		Professor	2	(2.7)	14	(3)
		Total	75	(33.5)	461	(39.5)
	TUF	Lecturer	37	(68.5)	92	(53.2)
		Assistant Professor	10	(18.5)	35	(20.2)
		Associate Professor	2	(3.7)	20	(11.6)
		Professor	5	(9.3)	26	(15)
		Total	54	(24.1)	173	(14.8)
Grand Total			**224**		**1168**	

In the selected study group (Sample), 42.4% (n=95) faculty members were selected from University of Agriculture Faisalabad, which has total of 534 faculty members, 33.5% (n=75) from Govt. College University Faisalabad, total faculty members of this university was 461 and 24.1% (n=54) from Faisalabad university which has 173 faculty members.

ICT Skill Level

The ICT skill level Scale consisted of ten items. The findings of the item reliability was α=0.845 for all ten questions. On an average members are agree that they have a skill of operating MS word, handling hardware like printers, had a skill of using ICT for E-mailing and had a skill of using World Wide Web in aid to their teaching.

Table 3: Summery Descriptive of ICT Skill level of Respondents

	Mean	**Std. Deviation**
• Skill of Installing new Software	2.94	.886
• Use printer	3.45	.499
• Use of Keyboard	3.41	.492
• Operate MS Word	3.64	.480
• Operate Power point	3.42	.736
• Operate Excel	3.21	.934
• Operate MS Access	2.23	1.088
• Use for Email and Discussion Forum	3.67	.721
• Use the Web for Browse Information	3.64	.819
• Solve Problems relating Operations of Computers	2.64	1.144

4.1. Pattern of ICT use

The pattern toward ICT technology, was measure by the score of the single item using a 5-point likert type scale showed 47.8% (n=107) often used computers and 33.9% (n=76) very often uses the ICT in their teaching. 43.7% (n=62) Academics and 54.9% (n=45) Administrative job nature faculty members often uses ICTs. Very often use of ICT was limited to 37.3% academics and 28% are administrative faculty members.

Table 4: Pattern of use and Job Nature

		Job Nature				Total	
		Academic	(%)	Administrative	(%)		
Pattern	Rarely	-		1	(1.2)	1	(1.2)
	Sometimes	16	(11.3)	13	(15.9)	29	(12.9)
	Often	62	(43.7)	45	(54.9)	107	(47.8)
	Very Often	53	(37.3)	23	(28.0)	76	(33.9)
Total		142	(100)	82	(100)	224	(100)

4.2. Purpose of use

The responses of faculty members in the study group to the 10 items, disclosed that faculty members make use of ICT most as a means of communication (88.7%), as searching for information about the course (86.6%), and for preparing their lecture notes (92.4%).

Table 5: Purpose of use in Academic and Administrative Faculty Members

	I use ICT for	F	%
Academic	Searching information on the Internet about the course.	194	86.6
	Preparing the course and lecture notes.	207	92.4
	Making presentations in the course.	124	55.3
	Carrying out studies in laboratories or workshops, and making Experiments.	80	33.6
	Making presentations in the course.	187	83.4
Administrative	Publishing the lecture notes and the announcements (assignments, projects, etc.) concerning the course on WWW.	98	43.7
	Preparing exam questions.	129	57.5
	Statistical analysis of exam results.	199	88.8
	Official correspondence.	89	39.7
	As a means of communication.	199	88.7

Furthermore the faculty members make use of ICT least, for publishing their lecture notes and the announcements concerning the course on WWW (43.7%). On the other hand the low percentage (33.6%) of using ICT in laboratories and workshops and for making an experiment may derive from the fact that the study fields of all faculty members do not require laboratory, workshop or experiments.

Faculty Members and ICT Facilities

42%(n=94) faculty members found Lab equipped with the Internet connections, just 14.3% members found labs equipped with the multimedia projectors and 29% (65) found labs not equipped with any of ICT facility.

Table 6: ICT Facilities Available in Institutions

	None		Computer		Internet Connection		Multimedia Projector	
	Frequency	(%)	Frequency	(%)	Frequency	(%)	Frequency	(%)
Classroom	171	(76.4)		-	8	(3.5)	45	(20.1)
Lab	65	(29.0)	33	(14.7)	94	(42.0)	32	(14.3)
Seminar Meeting Room	58	(25.8)	42	(18.8)	35	(15.7)	89	(39.7)
Administration Office	42	(18.8)	60	(26.8)	87	(38.8)	35	(15.7)
Office	73	(32.6)	45	(20.0)	94	(42.0)	12	(5.4)

Good sign was found in seminar meeting room where 39.7% (n=89) faculty members found seminar and meeting room equipped with the multimedia projectors. Also 25.8% (n=58) members found no facility in seminar meeting room also.

Almost 60% of the faculty members found administration offices equipped with computer and internet connection facilities. More than half faculty members almost 62% of faculty members have PC and internet connection facility in their own offices for their personal use. 5.4 % faculty members also have multimedia projectors in their own offices.

4.4 Access to ICT Facilities

It was identified that the faculty members have access to the Laptop and computers, (25.9%) and (35.3%) in the departments but access to the internet in department is quite low (8.8%). 35.7% easily access internet in the department labs and also some 18.8% have Laptops not their own but in easy access.

Table 7: Access to ICT facilities of Faculty Members

	Computer		Computer with internet		Laptop with wi-fi net	
	Frequency	(%)	Frequency	(%)	Frequency	(%)
Own at Home	15	(6.7)	69	(30.8)	140	(62.50)
Department for Personal Use	58	(25.9)	87	(8.8)	79	(35.3)
In Lab, Easy excess	102	(45.5)	80	(35.7)	42	(18.8)

Faculty Members and ICT Usage

The longest duration of using ICT stated by the respondent was 1-3 years (38.4%) and the usage of ICT in the courses taught concerned, majority was composed of the respondents who have been using them for 1-3 years (64.3%). It had been found that almost 80% of faculty members have been using ICT in their courses for 1-7 years.

Table 8: Faculty Members Usage of ICT

	Years Using ICT		Years using ICT in courses	
	Frequency	(%)	Frequency	(%)
Do not use	8	(3.6)	19	(8.5)
1-3 Years	86	(38.4)	144	(64.3)
4-7 Years	49	(21.9)	38	(17.0)
8-11 Years	58	(25.9)	-	-
11+ years	23	(10.3)	23	(10.3)
Total	224	(100)	224	(100)

4.6. Perceived Characteristics of Innovations

The scale was composed of 12 item questions on 5 point likert scale anchored from strongly disagree to strongly agree. (**α=0.922)** for relative advantage, (**α=0.832)** for compatibility, (**α=0.892)** for ease of use and (**α=0.912**) for the observability.

Table 9: Summary of Descriptive Statistics of Perceived Attributes of Innovations

	Mean	Std. Deviation	Chronbach's Alpha
Relative Advantage			**0.922**
• Using ICT enables to accomplish task more quickly.	4.16	0.989	
• ICT improves the Quality of Work I do.	4.27	0.928	
• ICT much better than traditional approach in education.	4.17	1.052	
Compatibility			**0.832**
• ICT usage is appropriate for my work style.	3.87	0.926	
• I have necessary Skill to utilize ICT.	3.98	0.860	
• Using ICT is Compatible with my current Job.	4.00	0.806	
Ease of Use/Complexity			**0.892**
• Learning to operate ICT is easy for me.	4.16	.988	
• I am satisfied with the use of ICT as I am doing now.	4.27	0.928	
• My interaction with ICT is clear and understandable.	4.13	0.999	
Observability			**0.912**
• We have a supporting culture in using ICT.	4.16	0.989	
• I observe easily that others in department use ICT.	3.87	0.926	
• The results of using ICT are apparent to me.	4.16	0.988	

4.7. Measurement Model

CFA conducted for measurement model included the estimation of internal consistency reliability and the convergent and discriminate validity of the instrument items. Normality assumption was not violated with an acceptable range of Skewness and Kurtosis statistics with the value ranging from 0.10 to 2.29. Therefore, the maximum likelihood method of estimation was chosen for conducting SEM analysis.

In practice, Chi-square / degrees of freedom less than 3, CFI greater than 0.9, an AGF/TLI greater than 0.8, RMSR less than 0.1, and RMSEA less than 0.06 or 0.08 are considered indicators of good fit. As seen in table all goodness-of-fit statistics are in the acceptable range which described it as a good fitted model.

Table 10: Goodness of Fit results of Measurement Model

Construct	No. of items	χ^2	P	GFI	CFI	RMSEA
Interest-Final	3	7.018	0.0049	0.911	0.914	0 .033
Facility-initial	4	12.98	0.24	0.69	0.79	0.043
Facility-final	3	9.015	0.003	0.889	0.99	0.035
Attributes-initial	8	8.018	0.004	0.81	0.974	0.056
Attributes-Final	4	5.018	0.004	0.952	0.974	0.046

* GFI= Goodness of fit-index, CFI= Comparative Fit index,
RMSEA= root mean square error of approximation

4.8. Reliability and Validity

All reliability measures (composite reliability and Cronbach's alpha) were well greater than the recommended level of 0.70 as an indicator for adequate internal consistency (Hair et al, 2006; Nunnally, 1978).

Table 11: Reliability and Validity results of final Measurement Model

Construct	Alpha	CR	AVE	Indicator	Variables	means	FL	IR	P
Interest	0.78	0.69	0.653	Skill	X1	0.940	0.515	0.794	**
				Pattern	X2	0.007	0.683	0.673	*
				Purpose	X3	1.337	1.00	0.576	*
Facilities	0.74	0.80	0.573	Classroom	W1	0.001	0.57	0.571	*
				Lab	W2	0.002	0.80	0.796	**
				Office	W3	0.014	1.00	0.664	**
				Admin	W4	9.474	0.66	0.59	
Perceived Attributes	0.85	0.63	0.712	R.A	Z11	0.016	0.581	0.44	**
					Z12	0.034	0.304	0.63	*
				Comp.	Z21	0.002	0.915	0.45	**
					Z22	0.087	0.955	0.78	*
				Ease	Z31	0.021	1.407	0.84	*
					Z32	0.024	0.835	0.77	**
				Observability	Z41	0.002	0.844	0.52	*
					Z32	0.006	1.000	0.81	**

*CR=Convergent Reliability,*AVE= Average Variance Extracted,
*FL=Factor loadings, *IR= Item Reliability Score

As suggested by Fornell and Larcker (1981) and Hair et al. (2006), convergent validity is adequate when constructs have an average variance extracted (AVE) of at least 0.5. The constructs also illustrated satisfactory convergent and discriminate validity.

4.9 Structural Model

This study has investigated the underlying structural relationship between a) User interest, b) ICT facilities, c) Perceived Attributes, and d) ICT usage for higher education. These four factors were the latent variables which were not measured directly but estimated in the model from several different measured variables.

-2 log likelihood: 3881.497
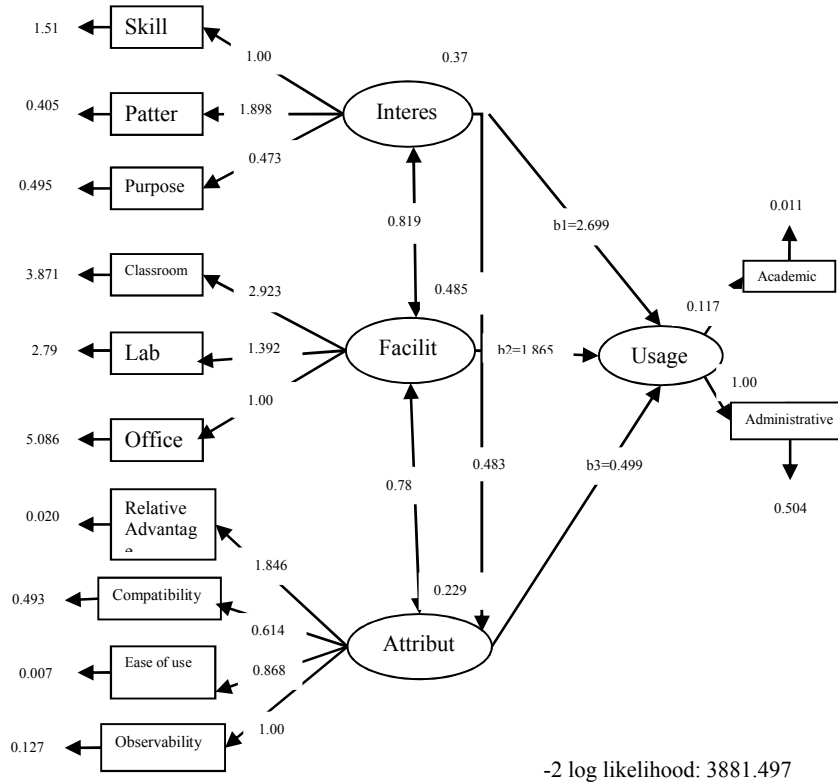
The Square root of Average variance extracted and the path coefficients indicate how well the model is performing. Square root of AVE showed the predictive power of the model, and the values should be interpreted in the same way as R^2 in a regression analysis. Average variance extracted by the construct facility was 0.485 which was higher than interest 0.38 and for attributes 0.229.

Table 12: Summary results of Path Analysis and Hypothesis Testing

Construct	Path coefficient (β)	R²	t-value	*P*- value
User Interest		0.616		
F1→F4, Interest→ Usage	b_1=2.699		11.46	0.041*
ICT Facility		0.69		
F2→F4, Facility→ Usage	b_2=1.865		7.01	0.035*
Perceived Attributes of ICT		0.478		
F3→ F4, Attribute→ Usage	b_3= 0.499		5.70	0.0216*

It was found that as the interest in ICT explain 61% of variation, availability of ICT facilities explained 69%, Perceived Attributes of ICT explained 48% of variation in ICT usage.

H1 postulates that User Interest has significant effect with t- value 11.46 and p<0.05. Hypotheses H2 was supported and proved that ICT Facilities have a significant effect on ICT usage with Path coefficient from construct facility to usage b2= 1.865 with t value= 7.01 and p<0.05. Hypothesis H3 was supported with path coefficient b3=0.499 with t-value = 5.07 and p<0.05. The Perceived Attributes have significant effect on ICT usage.

The results showed that ICT facilities in higher educational institutions exhibited the strongest direct impact on ICT usage which is composite of both instructional and managerial tasks. All hypotheses postulated by the structural model are supported.

Table 13: Average Variance Extracted – Square Multiple Correlations of Factors

	Interest(v1)	Facility(v2)	Attribute(v3)
Interest(v1)	0.378		
Facility(v2)	0.819	0.485	
Attribute(v3)	0.483	0.789	0.229

In addition to the statistical significance of the path coefficients, the strength of the relationship plays a role in determining the relationships to be weak, moderate or strong. Following Cohen's (1988) rules of thumb, a cut-off correlation value less than 0.2 have been considered to be weak in this research. The correlation value between 0.2 and 0.5 is defined to be moderate. The correlation of greater than 0.5 is considered to be strong.

In above structural model the Squared multiple correlations between Interest and facility construct was strong 0.891 as compared to Interest and Attribute Construct (0.483) and Facility and Attribute Construct (0.789) which proved the H4 and H5, i.e. Facilitating conditions have positive effect on teacher's Interest in ICT and ICT facilities have positive effect on perceived Attributes.

Model Fit Summary

Fit indexes which are commonly used in the literature (χ^2/d.f, CFI, NNFI/TLI, RMSEA, AIC, BIC) were employed to test model fit. The fit indexes of the model were included in the values which are acknowledged in the literature. The commonly used

measures of model fit, based on results from an analysis of the structural model, were summarized as

Fit indices	Observed Value	Recommended Value
Chi-Square/d.f	2.14	<3.00
CFI	0.978	≥0.90
TLI	.92	≥0.80
RMSEA	.043	≤0.05 or ≤0.08
AIC	-946.5032	Small values
BIC	-9182.2167	Small values

5. CONCLUSION AND LIMITATION

Structural equation modeling proved a very versatile statistical technique for modeling multivariate data. Findings from this study indicate that structural model for ICT usage in education fairly well explained by the three constructs. All hypotheses postulated by the structural model are supported.

Further findings showed that the interest of user has positive effect on ICT usage, more the interest more the usage of ICT in academic activities. Perceived usefulness of the ICT innovations also has positive effect on the ICT usage but important point has shown by the point that if facilities were available for the use of faculty member than the other two factors showed its impact.

The strength of the relationship as shown by the path coefficient showed the strong relation between interest and the usage while relation was moderate between availability of facility and use and weak between perceived characteristics and usage. Effective adoption and integration of ICT into teaching depends mainly on the availability and accessibility of ICT resources such as hardware, software, etc. Obviously, if teachers cannot access ICT resources, then they will not use them. Therefore, access to computers, updated software and hardware are key elements to successful adoption and integration of technology.

Under these circumstances, it is significant that ICT usage in classrooms should be more widespread, and faculty members should be supported both technically and educationally and the process should be institutionalized via the framework of the policies and strategies of universities.

This study has many limitations Firstly; this study does not include other soft factors such as social, environmental and economic factors, which may influence the usage effectiveness. Secondly, this study considered the integration, usage and adoption perception of teachers, and other stakeholders such as policy maker, educational developers and students are not taken into account. Thirdly, the sample is confined to small segment of the University teachers of just district Faisalabad population.

For future studied it is recommended that not only direct influenced latent variables there are many number of indirectly affecting latent variables that may influenced the adoption and usage of ICT in higher education.

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GENDER DIFFERENCES IN THE ATTRIBUTION
PATTERNS OF MAINSTREAM SCHOOLS

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ABSTRACT

The study was based on comparison of the academic achievement of high and low attribution groups belonging to mainstream schools and by doing so the effect of these causal attributions on students' subsequent academic achievement is found, the gender differences in students' academic attribution patterns were also found. Sample of the study was 260 tenth grade students from Rawalpindi and Islamabad districts of Pakistan. The design of study was causal comparative.

The statistical techniques of frequency distribution, mean, standard deviation, median, and t-test were used for analysis. The main conclusion drawn from the study was that there was significant difference between the academic achievement of intrinsically motivated students with high causal attributions and that of extrinsically motivated students with low causal attributions thus confirming Weiner's attribution theory. And the students who experience success usually attribute their success to internal and controllable factors. There was no difference between the attribution patterns of male and female students.

KEYWORDS

Attribution Patterns; Social Psychology; Extrinsic Motivation; Intrinsic Motivation; Gender.

1. INTRODUCTION

Attribution means to say or believe that something is the result of a particular thing. To illustrate, success is attributed to good luck (Hornby, 2000). As argued by Fritz Heider back in 1958, individuals have an innate desire to understand the causes of important events in their lives. Heider's work marks the birth of attribution theory, which is the study of causal perceptions and their influence on behaviors (Dasborough, Harvey & Martinko, 2011). Further theoretical framework was extended by Weiner and his colleagues into a major research paradigm of social psychology. Its main focus is the justifications people give to their own success or failure and the effects of such explanations on the future of students in terms of their expectations for success, emotional reactions, self-esteem, risk-taking behavior, their consistency at achievement-related tasks, and even on the actual consequences of actions (Gagne et al. 1993; Stoeber and Becker, 2008).

Weiner (1986) also anticipated that individuals have initial affective responses to the potential consequences of the intrinsic or extrinsic motives of the actor, which in turn influence future behavior. That is, a person's own perceptions or attributions determine the amount of effort the person will engage in activities in the future. Weiner suggests

that individuals exert their attribution search and cognitively evaluate casual properties on the behaviors they experience. When attributions lead to positive affect and high expectancy of future success, such attributions should result in greater willingness to approach to similar achievement tasks in the future than those attributions that produce negative affect and low expectancy of future success.

Weiner explains that people give different reasons for their success and failures, these explanations can be analyzed in terms of three sets of characteristics, these are as:

i)   First, the reason of success or failure may be internal or external to the student. That is, we may think of success or failure because of the factors that we believe have their origin within us or because of the factors that originate in our environment.

ii) Second, the perceived cause of success or failure may be either stable or unstable. If we believe cause is stable, then the outcome is likely to be the same in future. If it is unstable, the outcome is likely to be different in future.

iii) Third, the cause of success or failure may be interpreted as either controllable or uncontrollable. A controllable factor is the one which we believe we ourselves can alter the outcomes if we wish to do so. An uncontrollable factor is the one that we do not believe we can easily alter (Bempechat, 1999).

Since Weiner's theory of achievement motivation tells how expectations, emotions, and performance at achievement tasks are determined by the causes that students attribute to prior outcomes, it is likelihood that the difference in academic achievement, among the students sitting in the same classroom may be due to the difference in their causal attribution patterns. Ability, effort, task difficulty and luck are four forces given by Weiner related to attribution theory (Martinko, 2004). In term of the characteristics discussed previously, these four factors can be analyzed in the following way:

a.   Ability is a relatively internal and stable factor over which the learner does not exercise much direct control.

b.   Task difficulty is an external and stable factor that is largely beyond the learner's control.

c.   Effort is an internal and stable factor over which the learner can exercise a great deal of control.

d.   Luck is an external and unstable factor over which the learner exercises very little control (Mezulis, 2004).

The explanations given by students about their past achievement or lack of it guides their future behavior. To bring positive changes in any education system it is necessary to know attribution patterns of its students. To fulfill this objective it was very necessary to know the explanations of the students for their past success and failure. Such explanations according to Weiner effect their achievement in the next exam. The application of Weiner's theory to Pakistani society may not only expand this theory, but also prescribe solutions as how to raise achievement level of the students. For this purpose the students with high and low attributions were grouped in the present study, and the effects of their attributions on their subsequent performance were studied. To form groups an attribution scale was used which helped to segregate students with high attributions from those having low attributions.

Students will be more persistent at academic tasks if they attribute their academic successes to either internal, unstable, factors over which they have control (e.g. effort) or internal, stable factors over which they have little control but which may sometimes be disrupted by other factors (e.g. ability disrupted by occasional bad luck). Therefore, one way to change our motivation is to change our beliefs and attributions. Weiner (1980) states: "Causal attributions determine affective reactions to success and failure. For example, one is not likely to experience pride in success, or feelings of competence, when receiving an "A" from a teacher who always gives A grade, or when defeating a tennis player who always loses. On the other hand, an "A" from a teacher who gives few high grades or a victory over a highly rated tennis player following a great deal of practice generates great positive affect.

The results of the present study might be helpful in verifying whether the students are motivated to learn or they are merely crazy for grades and the role that the educational institutions are playing in negatively or positively effecting their attributions. Moreover, the results of the study might be fruitful to motivate the students while developing high attributions, thereby improving their academic performance. And by convincing them that intelligence and ability can be cultivated. The results of the present study might also enable teachers to alter low attributions of pupils and raise their academic achievement.

It was found by Broussard (2002) that race and gender are significantly relevant to achievement in Mathematics. Similarly Mecce (2001) found that there was a slight inclination of girls to feel negative about mathematics. Sex differences in confidence, expectancies and self-evaluations of ability are found in girls when achievement task is new and unfamiliar and it was found that girls prefer to choose the means of reducing anxiety. Addiba (2004) found that high achievers significantly attributed their outcomes to effort and ability and the low achievers to luck and task difficulty.

The results of these studies are in line with the findings of present research. Differences were found in the attribution patterns between students from China and students from Australia in a study conducted by Cao and Bishop (2001). . Tariq et al (2011) investigated gender differences among attribution patterns of students, where girls showing lower levels of extrinsic motivation and taking more responsibility for their failure as compared to boys.

2. OBJECTIVES OF THE STUDY

The main objectives of the study were:
   i) To measure the attribution patterns of students of mainstream schools
   ii) To find out students with high and low attributions
   iii) To find out mean attribution and mean achievement scores of both high and low attribution groups of students
   iv) To compare the academic achievement of students of both high and low attribution groups
   v) To find out mean attribution scores of both male and female groups of students
   vi) To find out gender differences in students' attribution patterns

3. HYPOTHESES

Following were the main null hypotheses of this study;

Ho1: There is no significant difference between the mean achievement scores of low and high attribution groups

Ho2: There is no significant difference between mean attributions scores of male and female students

4. METHODOLOGY

4.1 Population

Students of tenth grade studying in mainstream schools of Rawalpindi and Islamabad districts constituted the population of this study.

4.2 Sample

The two-stage cluster sampling procedure as suggested by Gay (2002) was adopted for the purpose of selection of the sample. A sample of 260 students (100 girls and 160 boys) was randomly selected from 10 mainstream schools. The cluster sampling technique was used to initially select schools, followed by random selection of students from the selected schools.

4.3 Research Tool

Two types of research tools were used i.e. attribution scale and gazettes.

i) Attribution scale for students: A 30 item causal attribution questionnaire based on five point rating scale items (appendix I) was developed in the light of Weiner's attribution theory. The options included strongly disagree, disagree, uncertain, agree and strongly agree.

ii) Achievement scores from gazettes: The achievement scores were taken as the marks obtained by the students in their subsequent examination held after measuring their causal attributions. These achievement scores were taken from gazettes published by published by Rawalpindi and Islamabad boards for the purpose of announcement of result.

The constructed instrument was pre-tested on a small sample. To ensure reliability of the attribution scale, internal consistency method (rationale equivalence reliability) was employed, for this purpose Kr-21(Kuder Richarson-21). The reliability co efficient was found to be 0.86.

4.4 Data Collection

In order to collect the data about the variable of attribution patterns a self-developed attribution scale after pre-testing were personally administered to each student in the sample. The scores of the students on most recently held subsequent examination were obtained from the concerned quarters, which served as a measure of students' academic achievement.

5. DATA ANALYSIS

The questionnaire items regarding students' attribution patterns were scored by assigning the score of ranking between the score of 1 to 5 to each student response. The total attribution score was determined by summing up scores attained by him on each item. On the basis of attribution scores, students were classified into two groups i.e. high attribution group and low attribution group by using median as cut off point. The gender

differences in the attribution patterns of students were also found by separating attribution patterns of male and female students. To test the null hypotheses, t-test was used; the level of significance used was .05

Table 1: Significance of difference between mean achievement scores of low and high attribution groups belonging to mainstream schools

Categories	Mean	SD	SE mean	t	p
High attribution group	431.03	28.62	4.89	3.90	<.05
Low attribution group	307.88	47.72			

df=258 t.05=1.90

The entries of the above table indicate that the obtained difference between the average achievement scores of the high attribution and low attribution groups was 123.15. This difference was found to be significant at .05 level of confidence. The first null hypothesis was therefore rejected. The difference being in favor of high attribution means that high attribution group did well on subsequent examination.

Table 2: Significance of difference between mean attribution scores of male and female students belonging to mainstream schools

Categories	Mean	SD	SE mean	t	p
Male students	101.23	8.01	1.162	1.52	<.05
Female students	103.0	9.75			

df=258 t.05=1.96

The entries of the above table indicate that the obtained difference between the average attribution scores of male and female students belonging to mainstream schools was 1.77. This difference was found to be not significant at .05 level of confidence. The second null hypothesis was therefore retained. There is no significant difference between the attribution patterns of male and female students belonging to mainstream schools.

6. CONCLUSION

The attribution patterns of the students of mainstream sector as per their opinion were positive and constructive, average attribution score of X grade students being 103.36 out of the maximum score of 150. It is concluded that actual difference of the performance of students belonging to mainstream schools, between mean achievement scores of the high attribution group over low attribution group was highly significant and this difference is attributed to their attribution patterns. When data is analyzed separately it is found that there is no difference in the attribution patterns of male and female students belonging to mainstream.

7. RECOMMENDATIONS

Following are the recommendations in the light of the findings of the study:

i) Communicate high expectations for student performance. Help them to achieve these standards.
ii) Attribute their success to combination of effort, high, ability and learning skills. Downplay the influence of luck on student achievement.
iii) Attribute student success to effort only when they have actually made effort.

iv) Attribute student failure to factors that are controllable and changeable. Do not respond to student mistakes with pity, praise for a good try and unsolicited help.

v) When student fail despite effort, attribute it to lack of effective learning methods and help them acquire such skills as learning for understanding than rote learning.

vi) Praise student effort as a personal characteristic rather than effort itself, i.e. "you are hardworking" as opposed to "you worked hard".

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ESTIMATION OF HOUSEHOLD EXPENDITURES ON THE BASIS
OF HOUSEHOLD CHARACTERISTICS BY REGION

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ABSTRACT

Region of household is an important indicator to discriminate the expenditures pattern of household. In this research our objective is; to estimate total household expenditures on the basis of considered independent variables for each region of household, to investigate the role of independent variables in estimating HH expenditures and to compare the performance of Multilayer Perceptron Neural Network model and regression model. For this purpose, data is obtained from HIES survey (2007-08) conducted by FBS. Multiple Regression analysis and Multilayer Perceptron Neural Network model has been used for the analysis of data. In this study, dependent variables is total household (HH) expenditures, and independent variables are; income, assets, number of rooms, number of earners, age of head, family size, proportion of members less than of age 5, proportion of out of school children, region and sex of head, proportion of members greater than of age 65 of households. Results reveal that in rural areas; household expenditures are significantly estimated by family size, proportion of children less than of age 5, number of earners, proportion of out of school children, assets, income and number of rooms of households while in urban areas household expenditures are significantly estimated by Family size, number of rooms, assets and income of households. Performance indices show that MLP neural network model is best model to estimate the total expenditures.

KEYWORDS

HIES; Household Expenditures; Multiple Regression Analysis; Multilayer Perceptron Neural Network Model.

1. INTRODUCTION

Income is the consumption and savings opportunity acquired by an entity within a specified time frame, which is generally expressed in monetary terms. However, for households and individuals, "income is the sum of all the wages, salaries, profits, rents, interests' payments and other forms of earnings received in a given period of time".

Household income is habitually a main determinant of household expenditure patterns. The differences between expenditure patterns are largely an indication of differences in income between household groups or individual households. There are many factors which are influencing the preference on one hand and the income levels on the other hand, and they both are affecting the expenditure patterns. Expenditure patterns of household do not always differ spectacularly, particularly when controlling for income [Punt, et al. (2003)].

While analyzing the household income and consumption expenditures of household, we have to reflect on the sources of income. In Pakistan, there are many sources of income (such as wage and salaries, property owner occupied dwelling, livestock, crop, non-agricultural activities, social insurance benefits which are including gift and assistance, pension, domestic remittances, foreign remittances and other income).

Previously, farming has been regarded as the most important economic activity of rural households, particularly of poor rural households, and the foremost view of development has been the small-farm first perspective which focuses on encouraging agriculture among smallholders (Ellis & Biggs, 2001). It is argued that land possession and access to land are very closely related to the agricultural production and, likewise to food protection and rural income generation.

Land is considered as most important asset in a rural economy. In Pakistan, inequality in land ownership is one of the major causes of poverty. In landless households, self and paid employment are two most important income sources. However, among the poorest landless households, livestock, contract cultivating and share cropping have significantly greater share in household income than their richest counterpart who gain most of their income as employer, and from self and paid employment [Anwar (2004)].

Family size and dependency are highly correlated with expenditure and considered as important poverty predictors. Proportion of members greater than 65 and children are representing dependency. In rural areas, land, poultry, ownership of livestock, non-residential and residential property are high positively related to household expenditure. Further, owner cultivator, medium and large farmers (land ownership of 12.5 acres and greater) play a vital role in distinguishing between non-poor from poor.

There are some factors which are creating disparity in the earnings including regional location factors, sex, sector of employment, marriage, and some other characteristics. Mostly youngest and oldest age groups contribute more to overall inequality in the earnings. [Nasir and Mahmood (1998)]. The nature of inequality has varied between income and consumption expenditure. The income inequalities is in the middle class households while consumption inequality is low within middle and lower income group as compared to upper expenditure class [Blacklow and ray (1999)].

The gender, location and region of household head effects expenditure patterns. Female headed households consume more on food, fuel and clothing while male headed households consume more on income tax, housing, transport, savings, services and other items including beverages. There are differences in expenditure patterns between households from different income groups and racial groups. [Punt, et al. (2003)].

In this paper we will estimate total household expenditures on the basis of considered variables for each region and then compare the performance of MLP Neural Network model and Multiple linear regression model with respect to estimation

This research will provide background knowledge about those factors that influence household consumption activities. The way household members allocate their resources amongst themselves could affect the efficiency of policy intervention. So, policy makers should keep in mind the resource allocation behavior to make the individual level and the household level welfare policies.

2. OBJECTIVE OF STUDY

The objectives of this study are

- To estimate total household expenditures on the basis of considered independent variables for each region of household.
- To investigate the role of independent variables in estimating HH expenditures.
- To compare the performance of Multilayer Perceptron Neural Network model and regression with respect to estimation.

3. LITERATURE REVIEW

The purpose of this section is to provide the literature related to research problem. It provides background to understand current knowledge on a specific topic and enlighten the significance for the new study.

Maitra (2002) conducted a research to check the effect of household characteristics on living standards and poverty and to know how they all changed over the five years by using panel data from South Africa. He used probit analysis to look at the poverty status of household and quantile regressions to observe the living standard. Per adult equivalent household income was the major measure of living standard. Results showed that sex of head of household, ethnicity and region of residence and the education attainment of the household head significantly affect living standard and poverty status of household.

Kirkpatrick and Tarasuk (2003) conducted a research to compare food expenditure patterns of households on the basis of their income level and to observe the relationship between food expenditure patterns and the absence or presence of housing payments amongst low income households by using chi-square and multiple regression analysis. Data is obtained from Family Food Expenditure Survey-1996 conducted by Statistics Canada. Their findings indicated that access to fruits, vegetables and milk products among households may possibly be constrained in the situation of low incomes. This study suggested that there is a greater need to pay attention to the affordability of nutritious foods for low income groups.

Punt, et al. (2003) conducted a study to analyze the impact of different levels of household income on household expenditure patterns and to know how the expenditure patterns differ among households of different income level from different region and ethnic groups. In his study latest household income and expenditure survey (IES) data 1995 was used. The descriptive analysis was performed. It was found that the levels of household income are most important factor to determine household expenditure patterns as well as various other factors like race and location of households also affect expenditure patterns.

Jamal (2005) conducted a research to provide correlates of household consumption and poverty using the data from Pakistan Integrated Household Survey (PIHS) 2001-02. Regression analysis was used to estimate consumption functions for both urban and rural areas to predict poverty at national, provincial and district levels. He concludes that overall, 33% people were poor. Poverty incidence is more severe in rural areas are high as compared to urban areas.

Winters, et al. (2008) conducted a study to investigate the existence of micro level household development pattern in rural areas and to determine a relationship between sets

of income generating activities and income earned. Data from 15 developing countries was used to check such a pattern by examining the Engel's Law. The analysis showed that the share of income which was earned from rural non-agricultural activities was strong positively correlated with rising per capita income while agricultural production and per capita income were negatively related to each other.

4. DATA SOURCE AND ANALYSIS

4.1 Variable Description

The data for this study is taken from the Household Integrated Economics Survey (HIES) 2007-08 conducted by Federal Bureau of Statistics (FBS), Pakistan. The variable of interest is total expenditure of HH. It is obtaining from summing up expenditures on fortnightly goods (include food items we acquire once in every two weeks such as honey, sugar, sugar preparation, condiments spices (whole and powder), non-alcoholic beverages, readymade food and drink etc.), durable goods (include those items with a life expectancy of one year or more such as furniture, fixtures, clocks, wrist watches, television, radio, cutlery, kitchen utensils, etc.) and non-durable goods (include those items with a life expectancy of less than one year such as food, clothing, fuel and lighting, footwear, medicines, etc.).

The independent variable we considered in this study are; total income (Wages, salaries, profits, rent interest's pay) of HH, total assets (Land, poultry, fishing, livestock, residential and non-residential property, remittances, pension, non-agricultural establishments, financial assets and liabilities, loans and credits forestry, honey bee etc.), number of rooms, number of earners, age of HH head, proportion of members age less than 5, proportion of out of school children, gender of head, proportion of members greater age than 65 and family size and region of households has been used for the estimation of HH expenditures.

4.2 Data Analysis Technique

Multiple Regression analysis and Multilayer Perceptron Neural Network model has been used for the analysis of data.

The data for this study is taken from the Household Integrated Economics Survey (HIES) 2007-08 conducted by Federal Bureau of Statistics (FBS), Pakistan. There are some missing cases related to variables; total expenditure, income, assets, number of rooms, number of earners, age of head, family size, proportion of members less than of age 5, proportion of out of school children, region of head, proportion of members greater than of age 65 of households. So we have used only eligible cases. Multiple Regression analysis and Multilayer Perceptron Neural Network model has been used for the analysis of data.

5. RESULTS AND DISCUSSION

Before applying regression analysis, we test its assumptions like normality, linearity, homoscedasticity, no autocorrelation, and multicullinrearity etc. For households in urban area; Figure 1 shows the histogram with normal curve the shape of the curve is approximately normal. Figure 2 represents the normal P-P plot of regression studentized residual and dependent variable which tell us that the error terms follow normal distribution. In Figure 3, scatter plot for regression standardized predicted values and dependent variable shows the linearity in the behavior of our dependent variable (i.e.,

total expenditures). For households in rural area; Figure 4 shows the histogram with normal curve the shape of the curve is approximately normal. Figure 5 represents the normal P-P plot which tells us that the distribution of error term is approximately normal. In Figure 6, scatter plot for regression standardized predicted values and dependent variable shows the linearity in the behavior of our dependent variable.

To test of homogeneity of variances we perform Levene Statistic that shows the insignificant p-value which means that there is approximately constant behavior of variation in data (see table 1 and table 2).

The value of Durbin-Watson test is 1.892 and 1.847 respectively for households in urban and rural area, which show that there is no autocorrelation in the data (see table 7 and table 9). We can use the different approaches to detect multicollinearity such as: Part and Partial Correlation, Tolerance Value, Variance Inflation Rate (VIR), Eigen Values, Condition Index. Table 3,4,5 and 6 deals with the multicollinearity diagnostics. Here, the value of part and partial correlation do not fall sharply from the zero order correlation so we can say there is no possible problem of multicollinearity. Furthermore, the small tolerances show that large proportion of the variance in a given independent variable is accounted by other independent. The closer to zero the tolerance value show the high multicollinearity in independent variable by explain their variation in dependent variable. The tolerance values are close to 1 that indicates that there is no problem of multicollinearity and mostly tolerance values are close to one and greater than .56, so there is no problem of multicollinearity.

VIF is an alternative measure of collinearity. Large value indicates a strong relationship between predictor variables, If the value of the variance inflation rate (VIR) is greater than 2 then there is a problem of collinearity. The variance inflation rate (VIR) for this case is not greater than 2 (table 3 and table 5) shows that all the values of VIF less than 2 so there is no problem of multicollinearity. There is another measure to check the multicollinearity that is Eigen Values and Condition Index. If the eigen values is small (close to zero) then problem of collinearity exist. The value close to zero shows that small changes in the data will produce large effect on the regression estimates. According to table 4 and table 6 all the value not closed to 0 so there is no problem of Collinearity in both cases (i.e., urban and rural area). The condition indices are computed as the square roots of the ratios of the largest eigen value to each successive eigen value. If the value of condition index is greater than 15 than there is possible problem of collinearity and values greater than 30 there is serious problem of collinearity. Here, all values of condition index less than 15 (only one value is greater than 15 in the case of urban area HH) so there is not serious problem of collinearity.

The assumption in the diagnostics plots like linearity, homoscedasticity, normality are fulfilled and also tests of autocorrelation and multicullinrearity diagnostics shows no autocorrelation and not much serious case of multicullinrearity in our explanatory variables. There are some outliers exists in the data but deletion of those cases do not much affects the parameter estimates, so we include those values in our analysis.

Table 5 and table 9 shows the model summary for households in urban area and rural area respectively. Here, the value of R shows the correlation coefficient that measure the interlinear relationship between dependent variable "household expenditures" and independent variables income, assets, number of rooms, number of earners, age of head,

family size, proportion of members less than 5, proportion of out of school children, region and sex of head, proportion of members greater than 65 of households. For both cases, the value of r is greater than 0.9 which indicates that there is a strong positive correlation exists between dependent and independent variables. R square the coefficient of determination, is the squared value of correlation coefficients. It measures the closeness of fit the regression line to the data. Here, for urban area and rural area, R square is greater than 0.8 which shows that above 80% variation in total expenditure is accounted by independent variables that are used in the model and below 20% variation explained by other factors. Adjusted R square is measure the true measure how much variation explained by the model. Here, adjusted R square is approximately same as R square.

Table 8 and 10 shows the overall model fitting and report the significant F statistics which indicate that our model is fit for the given data. Further the p-value is less then alpha level ($\alpha = 0.05$) which represent that regression model is significant. In addition we can say that the independent variables that are included in regression model plays significant role to explain the variation in dependent variables.

Table 11 represents the regression coefficients with their test statistics and significant value for urban and rural area. Regression coefficient measures the average rate of change in the dependent variable while the other independent variables held constant. In rural area the household expenditures are significantly estimated by family size, proportion of children less than 5, no. of earners, proportion of out of school children, HH assets, HH income and no. of rooms. In urban area household expenditures are significantly estimated by family size, no of rooms in house, HH assets and HH income.

Table 12 represents the case summary for urban household expenditures in this analysis 162 (66.7%) cases were assigned to training sample and 81 (33.3%) cases to the hold out sample and total valid number of cases in this analysis are 243(100%).

Table 13 contains the network information, no of units in the input layer are 9 and no of units in hidden layer are 4 and output layer is based on one unit Standardized method is used to rescale data in input and output layer. Hidden layer uses hyperbolic tangent activation function while output layer uses the identity activation function. In output layer, the sum of square is used as an error function.

Figure 7 depicts the neural network model and grey lines show positive weights and blue lines show negative weights. The dependent variable household expenditures of households in urban area has strong positive relationship with 1 and 3 and strong negative relationship with 2 and 4 unit of first hidden layer. The weights of parameters also show the same relations as this figure show (see table 15).

Table 14 represents the model summary of training and holdout related to error. In this table the value of sum of square of error functions is 16.617 which is smaller than sum of square of error in regression analysis because in regression analysis sum of square of error is 715862613816.363 so this model is best to estimate the total expenditures of household in urban area. In training sample relative error is .072 and in holdout relative error is .114 these two are small which is very good for prediction purpose.

The predicted-by-observed shown in Figure 8. This shows the predicted values against observed variable (expenditures of household in urban area) in graph. This shows the linear relation between observed and predicted values as observed values increased predicted

value of expenditures increased. The Residual-by-Predicted Chart shown in Figure 9. This graph represents the residuals against predicted value of dependent variable (expenditures of households in urban area) and shows increasing trend in variation.

The importance of the independent variables for the prediction of the dependent is shown in Table: 16 and also same behavior in Figure: 10. This network model has given highest importance to income 100% and second importance give to household assets 47.6% so both of them have highest affect in estimating household expenditures of households in urban areas.

Table 17 represents the case summary for rural household expenditures in this analysis 1043 (71.3%) cases were assigned to training sample and 420 (28.7%) cases to the hold out sample and total valid number of cases in this analysis are 1463(100%).

Table 18 contains the network information, no of units in the input layer are 9 and no of units in hidden layer are 4 and output layer is based on one unit. Standardized method is used to rescale data in input and output layer. Hidden layer uses hyperbolic tangent activation function while output layer uses the identity activation function. In output layer, the sum of square is used as an error function.

Figure 11 depicts the neural network model and grey lines show positive weights and blue lines show negative weights. The dependent variable expenditures of households in rural area has strong positive relationship with 1, 2 and 3 units of first hidden layer. The weights of parameters also show the same relations as this figure show (see table 20).

Table 19 represents the model summary of training and holdout related to error. In this table the value of sum of square of error functions is 62.545 which is smaller than sum of square of error in regression analysis because in regression analysis sum of square of error is 1157122054090.487 so this model is best to estimate the total expenditures of household in rural area. In training sample relative error is .120 and in holdout relative error is .171 these. Two are small which is very good for prediction purpose.

The predicted-by-observed shown in Figure 12. This shows the predicted values against observed variable (expenditures of household in rural area) in graph. This shows the linear relation between observed and predicted values as observed values increased predicted value of expenditures increased. The Residual-by-Predicted Chart shown in Figure 13. This graph represents the residuals against predicted value of dependent variable (household expenditures in rural area) and shows increasing trend in variation.

The importance of the independent variables for the prediction of the dependent is shown in Table: 21 and also same behavior in Figure: 14. This network model has given highest importance to household income 100% and second importance give to assets 49.5% so both of them have highest affect in estimating household expenditures for rural area households.

Table 22 shows the measures of performance indices that are used to check the performance of MLP and Regression Model. We compare two models; Multiple Regression and Neural Network Multilayer Perceptron by using Value Account For (VAF), Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE) and results showed that for each case, the value of VAF is high in Neural Network MLP model than in regression model where VAF is relatively small. Here, the value of RMSE

is small in Neural Network MLP model than regression model and also value of MAPE is small in Network MLP model than regression model. So, Neural Network MLP is best model to estimate the expenditures in each case.

6. COMMENTS AND CONCLUSION

Results from multiple regression analysis shows that in rural area the household expenditures are significantly estimated by family size, proportion of children less than 5, no. of earners, proportion of out of school children, HH assets, HH income and no. of rooms. In urban area household expenditures are significantly estimated by family size, no of rooms in house, HH assets and HH income. In Neural Network Multilayer Perceptron model we used same variables that were used in Multiple regression. This model gives more importance to HH income and HH assets. From comparisons of two models; Multiple Regression and Neural Network Multilayer Perceptron by using Value Account For (VAF), Root Mean Square Error (RMSE) and Mean Absolute Percentage Error (MAPE), we conclude that for each case Neural Network MLP is best model to estimate the expenditures.

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APPENDIX

Table 1: Test of Homogeneity of Variances(a)

Levene Statistic	df1	df2	Sig.
.496	4	2137	.738

a region = Urban

Table 2: Test of Homogeneity of Variances(a)

Levene Statistic	df1	df2	Sig.
.150	3	867	.930

a region = Rural

Table 3: Coefficients(a,b)

	Collinearity Statistics				
	Zero-order	Partial	Part	Tolerance	VIF
(Constant)					
Age of head in completed years	.098	.039	.013	.687	1.456
household size	.382	.158	.054	.586	1.707
proportion of children less than 5 years	-.079	-.006	-.002	.798	1.253
proportion of members greater than 65	-.076	-.051	-.017	.782	1.279
number of earners per HH	.193	-.035	-.012	.781	1.280
proportion of out of school children	.414	.200	.068	.730	1.369
HH assets	.658	.751	.380	.809	1.237
total income	.835	.849	.536	.664	1.506

a Dependent Variable: Total expenditure

b. region = Urban

Table 4: Collinearity Diagnostics(a,b)

Dimension	Eigenvalue	Condition Index
1	5.879	1.000
2	.924	2.523
3	.898	2.558
4	.476	3.514
5	.410	3.787
6	.232	5.036
7	.101	7.629
8	.055	10.311
9	.025	15.402

a Dependent Variable: Total expenditure

b. region = Urban

Table 5: Coefficients(a,b)

	Collinearity Statistics				
	Zero-order	Partial	Part	Tolerance	VIF
(Constant)					
Age of head in completed years	.167	.006	.002	.734	1.362
household size	.568	.215	.083	.562	1.781
proportion of children less than 5 years	-.028	-.067	-.025	.856	1.168
proportion of members greater than 65	-.047	.000	.000	.836	1.196
number of earners per HH	.215	-.085	-.032	.835	1.198
proportion of out of school children	.258	.120	.046	.888	1.127
HH assets	.696	.784	.475	.816	1.225
total income	.741	.772	.456	.638	1.568

a Dependent Variable: Total expenditure

b. region = Urban

Table 6: Collinearity Diagnostics(a,b)

Dimension	Eigenvalue	Condition Index
1	5.785	1.000
2	.940	2.481
3	.885	2.557
4	.506	3.381
5	.421	3.707
6	.262	4.698
7	.099	7.627
8	.074	8.858
9	.029	14.104

a Dependent Variable: Total expenditure

b. region = Urban

Table 7: Model Summary[a,b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.943	.888	.887	33944.19887	1.892

a. region = Urban

b. Dependent Variable: Total Expenditure (Z+E)

Table 8: ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	5.794E12	8	7.243E11	628.579	.000[a]
1	Residual	7.282E11	632	1.152E9		
	Total	6.522E12	640			

a. region = Urban

b. Dependent Variable: Total Expenditure (Z+E)

Table 9: Model Summary(a,b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.927	.858	.858	28507.42590	1.847

a. region = Rural
b. Dependent Variable: Total Expenditure (Z+E)

Table 10: ANOVA(a,b)

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.115E12	8	8.893E11	1.094E3	.000
	Residual	1.173E12	1443	8.127E8		
	Total	8.287E12	1451			

a. region = Rural
b. Dependent Variable: Total Expenditure (Z+E)

Table 11: Coefficients of total expenditures by Region

	Rural			Urban		
	B	t	Sig.	B	t	Sig.
(Constant)	14017.554	3.921	.000	14919.713	2.158	.031
Age of head	-17.620	-.294	.769	103.747	.877	.381
Family size	1913.716	7.307	.000	1839.236	3.599	.000
Proportion of children < 5	-10965.627	-2.207	.027	-950.628	-.096	.923
Proportion of members > 65	-1598.469	-.237	.813	-17570.399	-1.287	.198
No. of earners	-2763.036	-2.922	.004	-1672.946	-.819	.413
Proportion of out of school child.	44948.139	4.319	.000	47281.548	4.986	.000
HH assets	.459	44.815	.000	.457	26.570	.000
HH income	.950	45.086	.000	.973	39.652	.000
No. of rooms	2670.393	4.820	.000	916.157	.786	.432

Table 12: Case Processing Summary[a]

		N	Percent
Sample	Training	462	71.3%
	Holdout	186	28.7%
Valid		648	100.0%
Excluded		5610	
Total		6258	
a. region = Urban			

Table 13: **Network Information[b]**

Input Layer	Covariates	1	Age of head	
		2	Household size	
		3	Proportion of children < 5	
		4	Proportion of members > 65	
		5	No. of earners per HH	
		6	Prop. of out of school children	
		7	Total of all assets per HH	
		8	Total income	
		9	No. of rooms per HH	
	Number of Units[a]			9
	Rescaling Method for Covariates		Standardized	
Hidden Layer(s)	Number of Hidden Layers			1
	Number of Units in Hidden Layer 1[a]			4
	Activation Function		Hyperbolic tangent	
Output Layer	Dependent Variables	1	Total expenditure	
	Number of Units			1
	Rescaling Method for Scale Dependents		Standardized	
	Activation Function		Identity	
	Error Function		Sum of Squares	
a. Excluding the bias unit				
b. region = Urban				

Table 14: **Model Summary[a]**

Training	Sum of Squares Error	16.617
	Relative Error	.072
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	00:00:00.204
Holdout	Relative Error	.114
Dependent Variable: Total expenditure		
a. region = Urban		

Table 15: **Parameter Estimates[a]**

Predictor		Predicted				
		Hidden Layer 1				Output Layer
		H(1:1)	H(1:2)	H(1:3)	H(1:4)	Expenditure
Input Layer	(Bias)	-.771	.215	.439	.002	
	Age of head	.038	-.078	.065	.120	
	Family size	-.008	-.012	-.106	-.122	
	Proportion below 5	.029	.056	-.230	-.178	
	Proportion above 65	-.035	-.061	-.046	-.024	
	No of earners per HH	.092	.060	-.136	-.038	
	Prop. of out school	.145	-.841	-.187	.515	
	HH assets	.092	-.216	.760	.124	
	HH Income	.191	-.211	.289	-.146	
	No of rooms per HH	-.031	-.015	-.236	-.205	
Hidden Layer 1	(Bias)					1.034
	H(1:1)					1.825
	H(1:2)					-.920
	H(1:3)					.988
	H(1:4)					-1.328
a. region = Urban						

Table 16: **Independent Variable Importance[a]**

	Importance	Normalized Importance
Age of head in completed years	.019	3.5%
Household size	.040	7.4%
Proportion of children less than 5 years	.020	3.6%
Proportion of members greater than 65	.012	2.3%
No of earners per HH	.025	4.6%
Proportion of out of school children	.046	8.6%
Total of all assets per HH	.257	47.6%
Total income	.539	100.0%
No. of rooms per HH	.043	8.0%
a. region = Urban		

Table 17: **Case Processing Summary[a]**

		N	Percent
Sample	Training	1043	71.3%
	Holdout	420	28.7%
Valid		1463	100.0%
Excluded		7805	
Total		9268	
a. region = Rural			

Table 18: **Network Information**[b]

Input Layer	Covariates	1		Age of head
		2		Household size
		3		Proportion of children < 5
		4		Proportion of members > 65
		5		No. of earners per HH
		6		Prop. of out of school children
		7		Total of all assets per HH
		8		Total income
		9		No. of rooms per HH
	Number of Units[a]			9
	Rescaling Method for Covariates		Standardized	
Hidden Layer(s)	Number of Hidden Layers			1
	Number of Units in Hidden Layer 1[a]			3
	Activation Function		Hyperbolic tangent	
Output Layer	Dependent Variables	1	Total expenditure	
	Number of Units			1
	Rescaling Method for Scale Dependents		Standardized	
	Activation Function		Identity	
	Error Function		Sum of Squares	

a. Excluding the bias unit
b. region = Rural

Table 19: **Model Summary**[a]

Training	Sum of Squares Error	62.545
	Relative Error	.120
	Stopping Rule Used	Maximum number of epochs (100) exceeded
	Training Time	00:00:00.985
Holdout	Relative Error	.171

Dependent Variable: Total expenditure
a. region = Rural

Table 20: **Parameter Estimates**[a]

			Predicted		
			Hidden Layer 1		Output Layer
	Predictor	H(1:1)	H(1:2)	H(1:3)	Expenditure
Input Layer	(Bias)	-.964	-.134	.323	
	Age of head	.015	-.130	.077	
	Family size	.003	.028	.019	
	Proportion below 5	.068	-.164	.066	
	Proportion above 65	.043	.143	-.120	
	No of earners per HH	-.113	.076	-.029	
	Prop. of out school	.032	-.005	-.001	
	HH assets	.014	.017	.315	
	HH Income	.230	.006	.140	
	No of rooms per HH	.070	.298	-.236	
Hidden Layer 1	(Bias)				1.157
	H(1:1)				2.249
	H(1:2)				1.741
	H(1:3)				2.452
a. region = Rural					

Table 21: **Independent Variable Importance**[a]

	Importance	Normalized Importance
age of head in completed years	.017	3.2%
household size	.071	13.9%
proportion of children < 5 years	.016	3.1%
proportion of members greater than 65	.023	4.5%
no of earners per HH	.030	5.9%
proportion of out of school children	.037	7.3%
total of all assets per HH	.254	49.5%
total income X	.514	100.0%
no. of rooms per HH	.037	7.3%
a. region = Rural		

Table-22: Measures of Performance Indices

Expenditures	VAF		RMSE		MAPE	
	MLP	Regression	MLP	Regression	MLP	Regression
	88.46127	87.57991	27225.990	29786.741	15.69811	17.46331

Dependent Variable: Total Expenditure (Z+E)
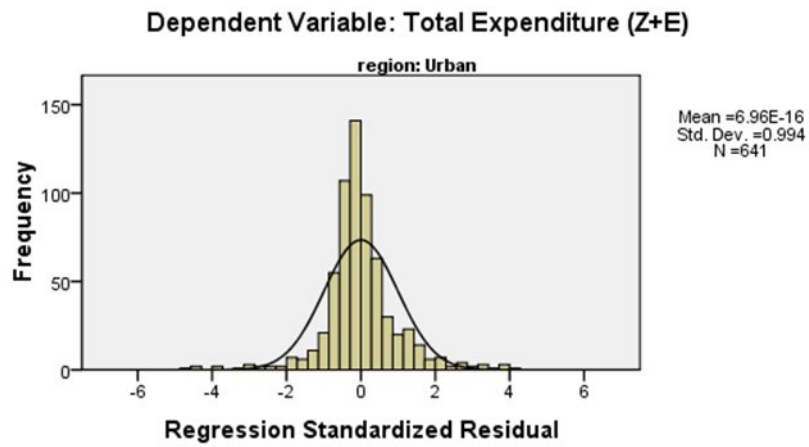
Figure 1: Histogram

Dependent Variable: Total Expenditure (Z+E)
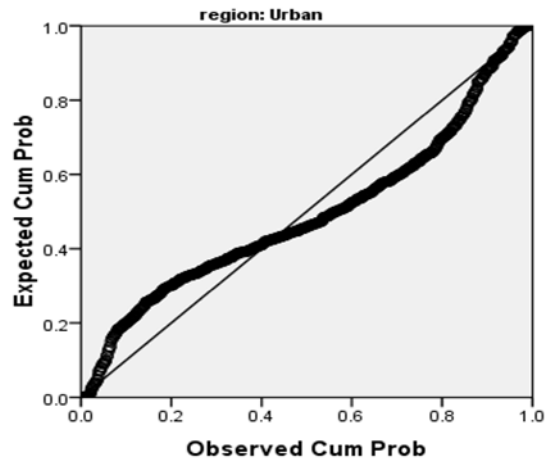
Figure 2: Normal P-P Plot of Regression Standardized Residual
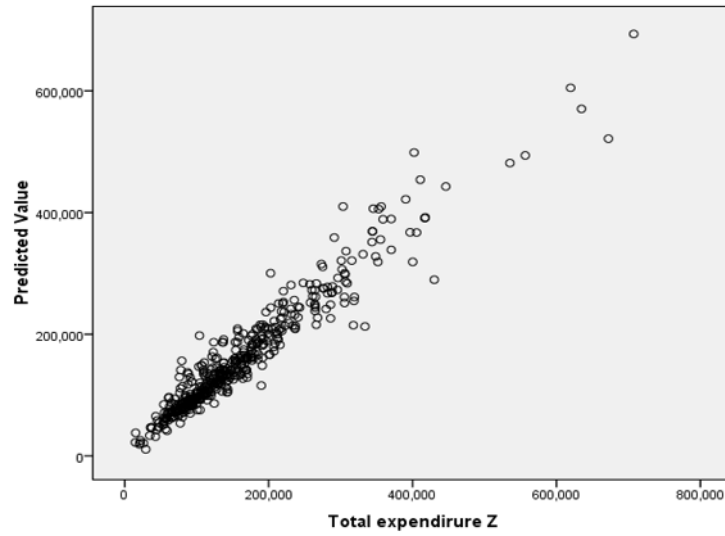
Figure 3: Scatter Plot
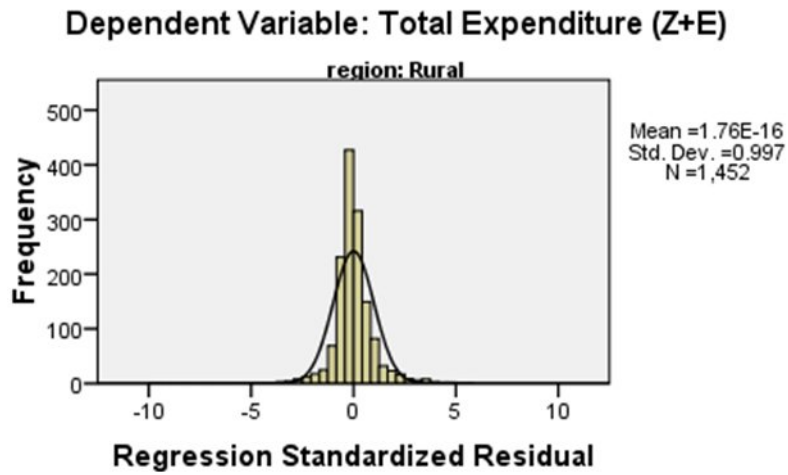
Figure 4: Histogram

Dependent Variable: Total Expenditure (Z+E)
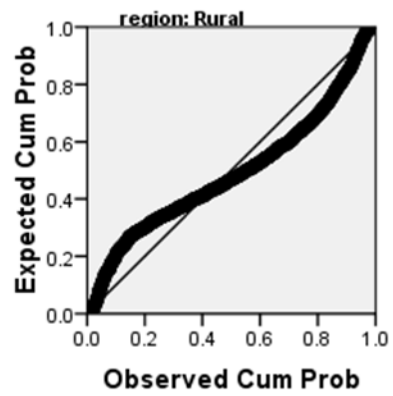
Figure 5: Normal P-P Plot of Regression Standardized Residual
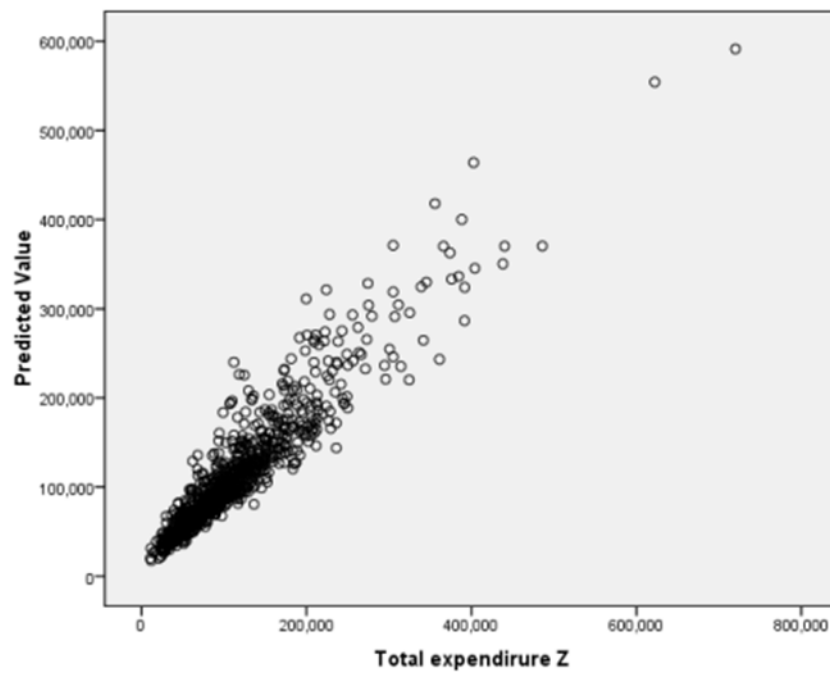
Figure 6: Scatter Plot
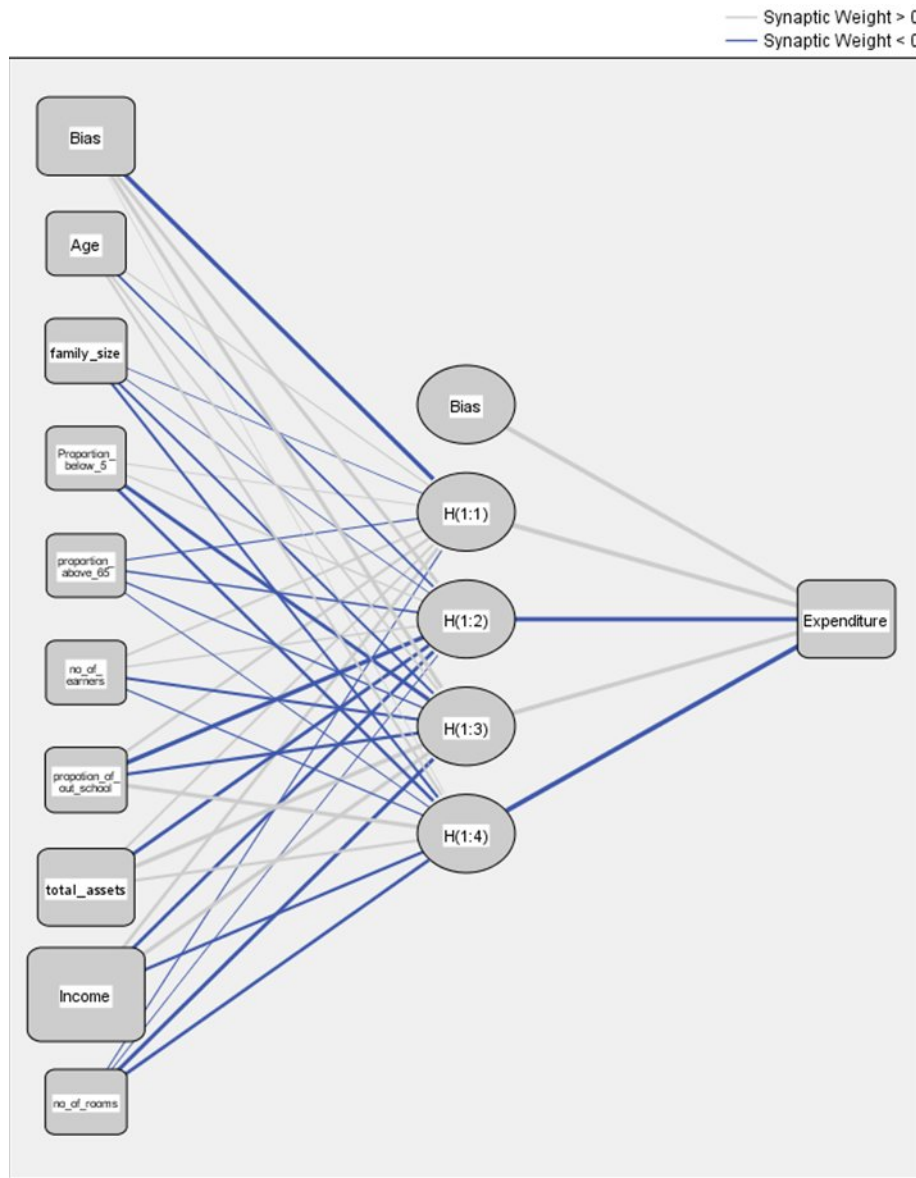
Hidden layer activation function: Hyperbolic tangent

Output layer activation function: Identity

Figure 7: Network diagram
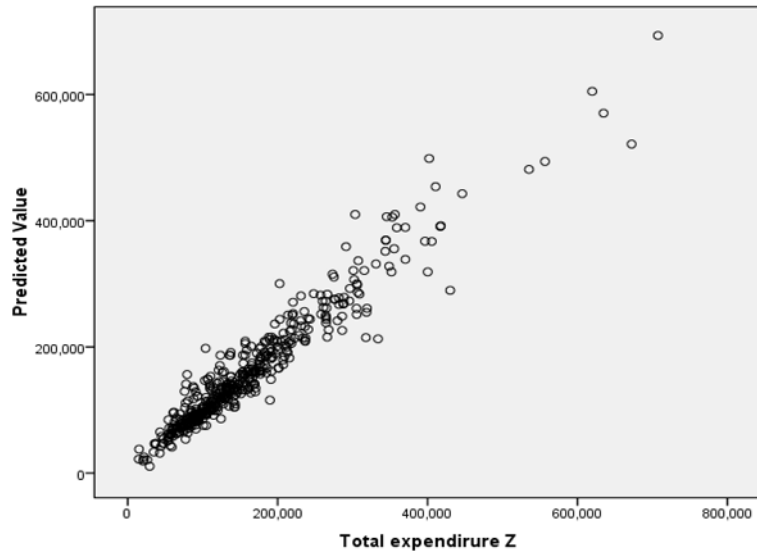
Figure 8: Predicted by Observed Chart
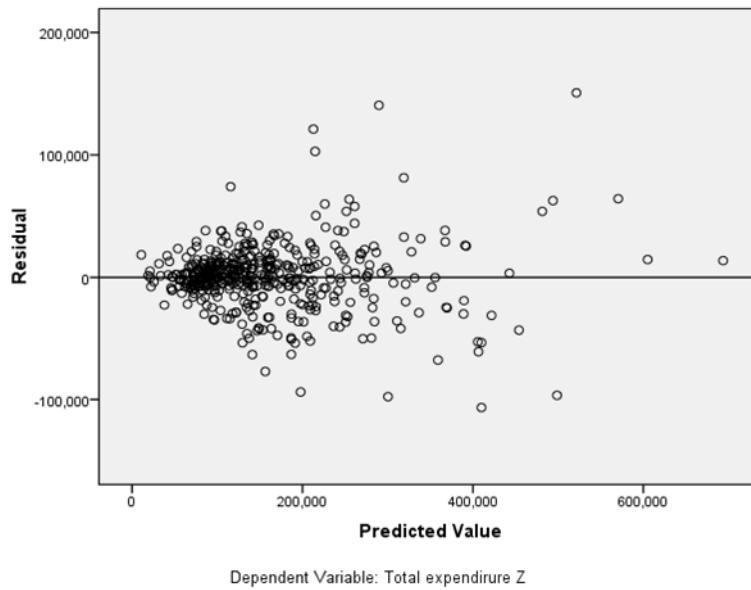
Figure 9: Residual by Predicted Chart
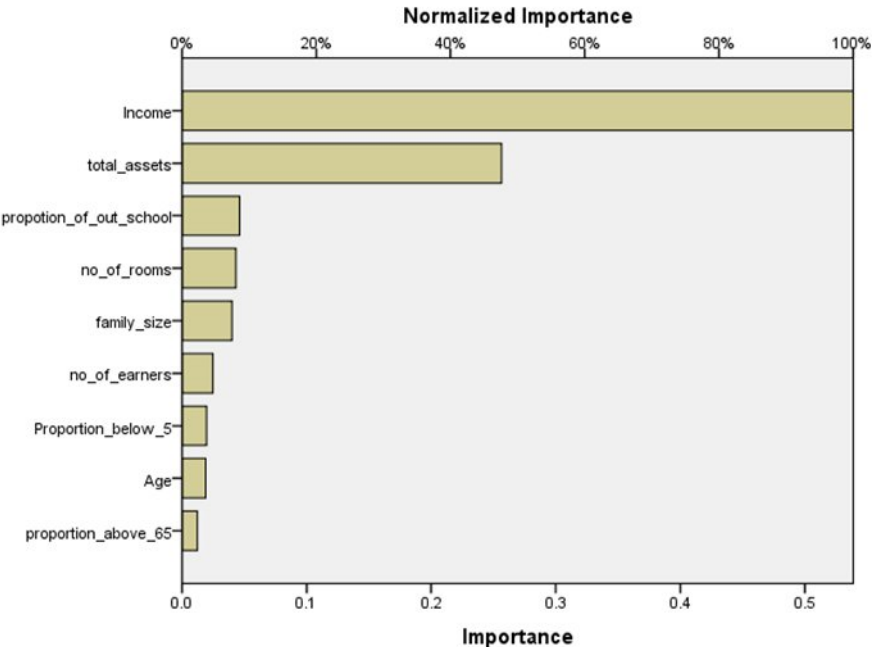
Figure 10: Independent Variable Importance Chart

Figure 11:   Network diagram
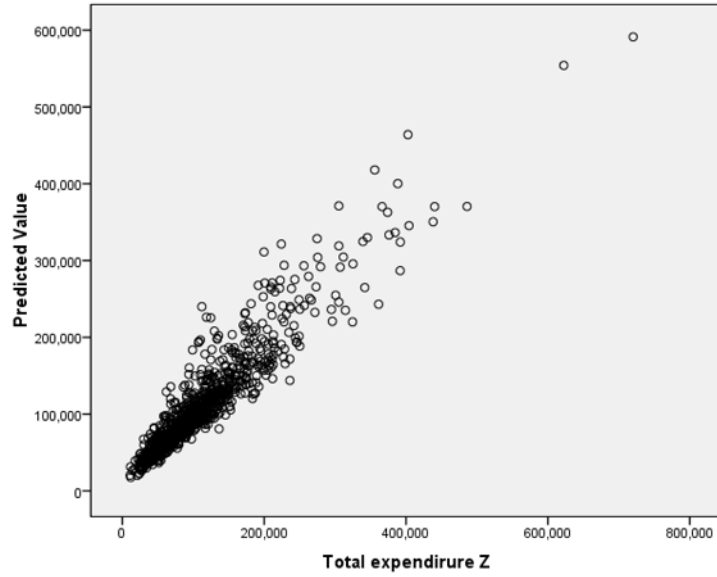
Figure 12: Predicted by Observed Chart

Dependent Variable: Total expendirure Z
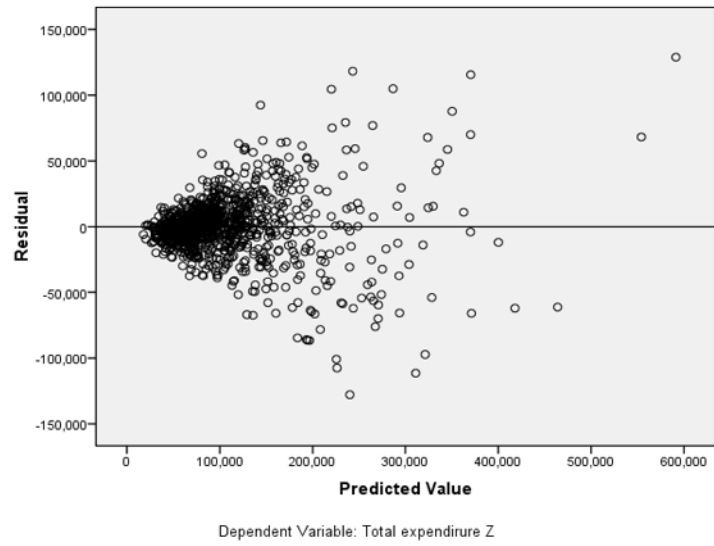
Figure 13: Residual by Predicted Chart
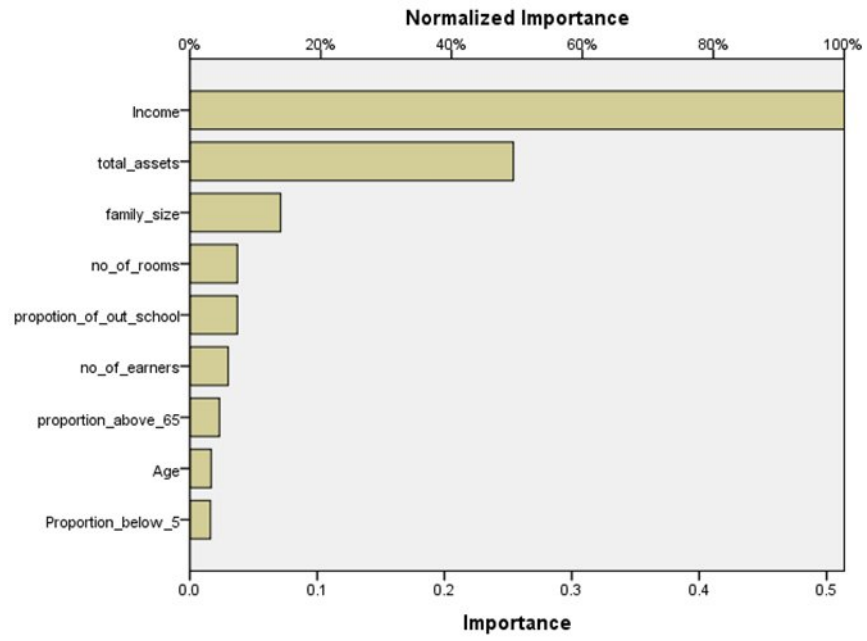
Figure 14: Independent Variable Importance Chart

PREDICTING THE WAGES OF EMPLOYEES USING SOCIO-ECONOMIC AND DEMOGRAPHIC DETERMINANTS: A CASE OF PAKISTAN

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ABSTRACT

In this study an attempt is made to develop a model to predict the monthly wages of regular paid employees on the basis of socio-economic and demographic determinants. Further it is investigated that which variables play more important role in prediction of monthly wages of employees. The data was obtained from Pakistan Labour Force Survey 2009-10 conducted by Federal Bureau of Statistics, Pakistan. The dependent variable is monthly wages of employees and independent variables are socio-economic and demographic characteristics of the employees. Multilayer Perceptron (MLP) Neural Network Model has been used for analysis purpose. The results showed that the demographic characteristics; age, gender and area of working, and the socio-economic determinants; education, job status and working hours are playing important role in predicting earning of employees.

KEYWORD

Earning, Socio-economic determinants, Demographic Determinants, Pakistan Labour Force Survey, Multilayer Perceptron.

1. INTRODUCTION AND BACKGROUND

The development of labor market has always been on the priority agenda of every country in the world. This is also one of the important objectives among developing countries, to measure the wage of employees' because earnings have a significant role in the wellbeing of the households'. The distribution of personal earnings has been changed in different periods across different countries (Karoly, 1992; Brandolini, Rosolia and Torrini 2010). This disparity in wages holds due to changes in factors that can affect individual earnings. These factors include both individual and labor market characteristics.

Now countries are trying to focusing on to enhancing the individuals' capacity to work more. Because it is believed that economic growth can be increased by enhancing the quality of workforce by concentrating on human resources. As human capital plays an important role in the development of a country. Since human capital is not only acknowledged for growth and reducing poverty, but it is also a basic requirement for human development. Presently IMF (2004) reported that indicators of human capital are also included in Millennium Developmental Goals (MDGs) specifically education.

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In the recent past many studies had been done which empirically analyzed the determinants of employees' earnings with different perspective (Klindt, Deaton and Landes 1981; Khan and Irfan 1985; Haque 1977; Nasir and Mahmood 1998; Xiao 2001; Aslam 2002; Panday 2003; Nazil 2004; Awan and Hussain 2007; Faridi, Hussain, and Bashir, 2010; Haq, Nawaz, Mahtab and Cheema 2012). These studies explore many socio-economic and demographic determinants that can affect earning of any employee.

Previous studies reported that higher education returns higher wages (Khan and Irfan 1985; Nasir 1998; Aslam 2002; Awan and Hussain 2007; Jaffry, Ghulam and Shah 2007). Haque (1977), Ashraf and Ashraf (1993) and Nazil (2004) pointed out that there are different returns to earnings for different level of education because one year of schooling raises earnings rapidly. This is due to positive relation between the education and development. Improvement in national progress will be more when people receive more education since education generate productive labor force that contributes in the economic growth of a country.

Except education, there are many socio-economic determinants that may affect individuals' earnings. Such as training of employees, occupation, job agreement and total number of working hours because wages may depend on these variables too. Technical training of employees will also cause to increase in the monthly earnings. Since individual that complete his or her training will get more wage as compare to those that did not complete their training even in the same establishment. Now talking about the total number of working hours, usually this variable is ignored in some studies like Nasir (1998). But individuals' that work more may get more wages comparative to other peoples that work less. Therefore it is important to consider this variable regarding wages.

This is also believe that occupation may also cause through which earnings may differ among individuals. As individuals that may work in business, industry or office may get different wages as compare to other occupations. Nazil (2004) empirically investigated that significant difference exists in earnings across occupations. In the same way job status may also cause to generate variation in the earnings amongst individuals'.

Other than socio-economic variables some demographic variables are also influential for individual's earnings these variables can be person's age, gender, marital status and area of working. It is also a well-established fact that age has significant effect on person's earning. Since experience is increased with increased age therefore earning is increased. Even in some studies like Nasir (1998) takes person's age as the proxy of experience.

Gender is also one of the important factors in determining the earnings. In previous literature many studies are presented on the topic related to gender wage differentials (Ashraf and Ashraf 1993; Nasir and Mahmood 1998; Li and Urmanbetova 2002; Yasin, Fani and Yaseen 2010). These studies reported that labor market is structured differently for males' and females with special reference to Pakistan where females constitute almost half of the population and involved in production either directly or indirectly, but do not have access even to their own earnings (Yasin, Fani and Yaseen 2010). In Pakistani society women are assigned to non-work activities more as compare to men. In a study

Bergman (1974) reported that employer can be biased if he uses an individual's gender to disqualify her from an occupation. Women as compare to men are restricted in low paying jobs usually services sectors.

Similarly regional differences (urban/rural) are also a leading factor regarding wages. As labor markets may have different performance across the region. Individuals having jobs in urban areas are considered to have more earnings as compare to those who work in rural areas. As urban areas may have greater likelihood for jobs and expected to have higher earnings, therefore it is important to consider the regional differences for earnings of individual.

In this present study the main focus is to develop a model to predict the monthly wages of the regular paid employees on the basis of the socio-economic and demographic determinants. Further the relative importance of these variables is analyzed that determines the monthly wages of employees that is which variables play more important role. Further in 1998 a study is conducted by the Nasir (1998) regarding personal earnings of employees considering the similar survey by FBS. As data considered in mentioned study was quite old and this present study is conducted by considering the latest data available.

After the introduction and background source of data and its characteristics are discussed in section 2 this section also provides the information about technique employed to fulfill the objectives. Section 3 represents the results of analysis and its interpretation and the main conclusions that are drawn from this study are given in section 4.

2. DATA AND METHODOLOGY

2.1. Source of Data
The data for this study has been obtained from Labour Force Survey (LFS) for year 2009-2010 that was conducted by Federal Bureau of Statistics (FBS), Pakistan. The population of LFS is consisting of all the rural and urban areas of four provinces of Pakistan excluding FATA and military restricted areas. A stratified two-stage sample design is used and developed by FBS for this survey. A sample of 36400 households consists of 263501 individuals is considered. In the LFS data, for some cases, information is missing on different variables. So after excluding missing cases for any variable the ultimately sample size of regular paid employees is 17427.

2.2. Data Description
The dependent variable consider for this study is monthly wages of regular paid employees that were earn from the main work. Independent variables are primarily related to socio-economic and demographic determinants of employees. Further detail of independent variables is given as follows.

I. Demographic Determinants
  i) Age
  ii) Gender
  iii) Marital Status(MS)
  iv) Migration Status
  v) Area of Working

II. *Socio-economic Determinants*
  i) Training
  ii) Occupation
  iii) Total number of working hours (THW)

  a. Job Type
  Type of job is categorized as
  i) Permanent job (PJ)
  ii) Contract job (CJ)

  b. Level of education
  Level of education is categorized as follows
  i)   No formal education (NFE)
  ii) Below matriculation (BM)
  iii) Matriculation but less than intermediate (MBI)
  iv) Intermediate but less than degree (IBD)
  v)   Degree and above (DA)

Except two variables, age and total number of working hours, all the other variables are binary. Table A1 given in the Appendix A contains the complete description of the above variables used in this study.

2.3. Neural Network Model:

Neural Network (NN) is an information processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information. The key element of this paradigm is the novel structure of the information processing system. It is composed of a large number of highly interconnected processing elements (neurons) working in unison to solve specific problems. All neural networks have an input layer and an output layer, but the number of hidden layers may vary.

2.3.1 The Multilayer Perceptron (MLP) Neural Network Model:

The following diagram illustrates a MLP network with three layers:
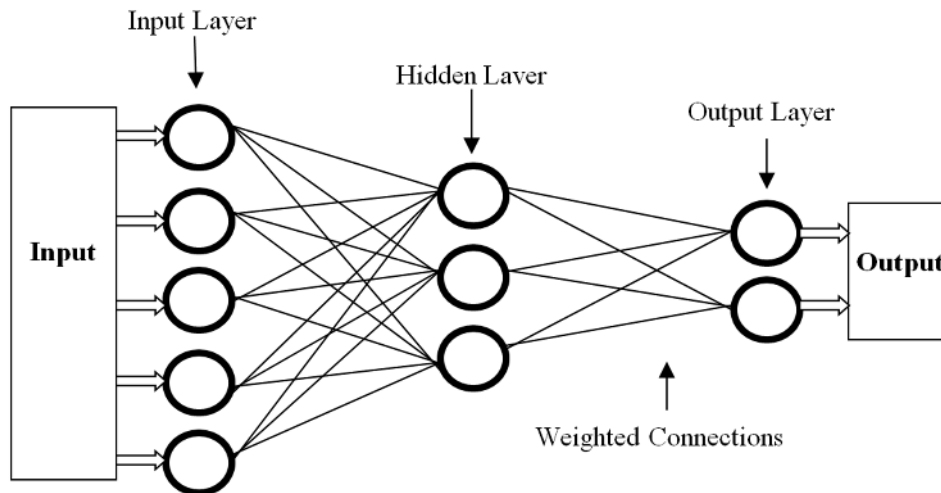
This network has an **input layer** (on the left), one **hidden layer** (in the middle) and an **output layer** (on the right) with two neurons. Different functions of all these layers are given below.

2.3.2 Input Layer:

A vector of predictor variable values $(x_1 \ldots x_p)$ is presented to the input layer. The input layer normalizes the values of these predictors into a specific range i.e. -1 to 1, 0 to 1 etc. The input layer distributes the values to each of the neurons in the hidden layer. In addition to the predictor variables in input layer, there is a constant input of 1.0, called the *bias* that is fed to each of the hidden layers; the bias is multiplied by a weight and added to the sum going into the neuron.

The basic reason to normalize the data is that, if inputs are generally on widely different scales then predictors with large values may overcome the predictors with small values. So it is useful to put the predictors into same scale. Some normalization methods are given as follows.

   a. Standardized normalization
   b. Adjusted normalization
   c. Sigmoid normalization
   d. Hyperbolic tangent normalization

2.3.3 Hidden Layer:

Arriving at a neuron in the hidden layer, the value from each input neuron is multiplied by a weight (w_{ji}), and the resulting weighted values are added together producing a combined value $\sum_{i=1}^{n} w_{ij} x_i$. The weighted sum $\sum_{i=1}^{n} w_{ij} x_i$ is fed into an activation function, which outputs a value. The outputs from the hidden layer are distributed to the output layer.

2.3.4 Output Layer:

When the output of hidden layer is appear at a neuron in the output layer, the value from each hidden layer neuron is multiplied by a weight, and the resulting weighted values are added together producing a combined value. The weighted sum is again fed to an activation function, which outputs a value.

2.3.5 Activation Function:

The activation function "links" the weighted sums of units in a layer to the values of units in the succeeding layer. Different types are activation functions are used by MLP in hidden and output layer. The most useable activations are given as follows.

   a. **Identity:** This is an activation function only for output layer **if** there is any scale dependent variable then this is the activation function for units in the output layer. It takes real-valued arguments and returns them unchanged. This function has the form:

   $$f(x) = x$$

b. **Hyperbolic tangent:** This activation function can be used in both hidden and output layer depending on type of problem**.** It takes real valued arguments and transforms them to the range (−1, 1). This function has the form:

$$f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}$$

c. **Softmax:** This activation function is appears only for the output layer if dependent variable is categorical. It takes real valued arguments and converts into the range (0, 1). If sum this function over all the categories then its sums to one. This function has the form:

$$f(x) = \frac{\exp(x_k)}{\sum\limits_{j} \exp(x_j)}$$

d. **Sigmoid:** This is another activation function that can appear in both hidden and output layer. It takes real-valued arguments and changes them to the range (0, 1). This function has the form:

$$f(x) = 1/(1 + e^{-x})$$

3. RESULTS AND DISCUSSION

MLP a neural network model is also used to predict the monthly wages of regular paid employees on the basis of socio-economic and demographic determinants. Result of the Analysis is given in Appendix A. Descriptive statistics of quantitative variables are given in the table A2 and table A3 contains the descriptive analysis of binary variables. Further tables contain the results of the MLP model. Case processing summary of MLP model is given in table A4 representing that total number of cases available is 17427. MLP model automatically divides the cases into two parts; one is for training propose and other for testing. 70.2% cases (12226) are used for training and remaining 29.8% cases (5201) are used for testing.

Full description of MLP model can be seen from figure A1 that is the graphical representation of the neural network model. It can be seen in the given picture that MLP network is consists of three layers. The number of nodes in the first layer (input layer) is equal to the number of independent variables and bias. As in the figure total number of nodes in the input layer is 29 whereas independent variables used in the analysis are 15. Number of nodes in the input layer are more than number of variables used in the analysis this is because 13 variables are binary and in the layer each category have one node therefore these 13 variables make 26 nodes (13*2=26) and two variables are quantitative (26+2=28), so input layer contains the 29 (28 + Bias) nodes. Second layer (hidden layer) contains 10 nodes and in the last layer (output layer) number of nodes are equal to the number of categories in the dependent variable. As the dependent variable is quantitative therefore it is just 1. The network automatically chooses hyperbolic tangent activation function for the hidden layer to link the weighted sum of values with the next layer (output layer) and identity activation function is applied to the output layer to produce the resultant value. In this figure, grey and blue lines show the relationships between input, hidden and output nodes, these relationships are estimated in the form of

weights. Grey lines show positive weights and blue lines show negative weights, the dependent variable wage has negative relationship with node 4 where as it has positive relationship with the remaining nodes of the hidden layer. As in the parameter estimation table (table A6) the weights for wage column are positive for all the nodes except for the 4th node.

The model summary table (table A5) presents information about the results of training and testing sample. In this table the value of sum of square of error for testing sample (1572.430) is much less than the training sample (3517.539). The error decreased from training sample to testing sample. The same situation appears for the relative error. The value of relative error is also decreased for training sample (0.578) to testing sample (0.571). The value is small and it is a good indication of the model prediction.

The importance of independent variables can be visualized from the table A7 and figure A2. The importance of an independent variable is measure how much the network model predicted value change by changing different values of independent variables. Normalized importance value is calculated as the importance values divided by the largest importance values and this figure expressed as percentages. The importance chart is basically a bar chart of the values given in the importance table, where bars are sorted in descending value of importance. It appears that variable of age and education degree above is the most important variables in predicting the wages of employees. Whereas permanent job, gender, no formal education, total number of working hours, area of working, education intermediate below degree, education Matriculation below inter, below matriculation are the corresponding important variables for earnings. But contract job, Migration, training complete, marital status and occupation (business, industry, and office) have least effect on prediction of earnings of employees.

The manual calculation and further detail of MLP model to predict the earnings of employees is also given in the Appendix. The purpose of this manual calculation is that by using this model one can predict the wage of an employee when variables for any near future are given.

4. COMMENTS AND CONCLUSION

The basic objective of this study is to develop a model by utilizing socio-economic and demographic determinants and to explore that which variables play more important role that determines the monthly wages of employees. So the developed model is given in the Appendix B and the relative importance as it is given in the importance graph (figure A2) we can see that from first ten variables three are related to the demographic determinants that are age, gender and area of working. On the basis of these results we can say that in demographic determinants age, gender and area of working are playing more important role as compare to the migration and marital status. Whereas from socio-economic determinants all the five categories of education, permanent job and working hours are appears in the first ten variables. Through this we can conclude that in socio-economic determinants contract job, training complete and occupation does not have as much impact on employees' earnings as other socio-economic determinants.

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APPENDIX A

Table-A1: Variable Description

Variables	Description
Wage	Monthly earning from main job
Migration status	1 if migrate 0 otherwise.
Area of work	1 if works in urban area 0 otherwise.
Training complete (TC)	1 if completed technical training 0 otherwise.
Gender	1 if male 0 otherwise.
Marital Status (MS)	1 if married 0 otherwise.
No formal education (NFE)	1 if NFE 0 otherwise.
Below Matriculation (BM)	1 if BM 0 otherwise.
Matriculation but below intermediate (MBD)	1 if MBD 0 otherwise.
Intermediate but below degree (IBD)	1 if IBD 0 otherwise.
Degree above (DA)	1 if DA 0 otherwise.
Occupation (Business, Industry, Office)	1 if occupation (business, industry, office) 0 otherwise.
Permanent Job (PJ)	1 if PJ 0 otherwise.
Contract Job (CJ)	1 if CJ 0 otherwise.
Age	Current age of the individual.
Total number of working hours (THW)	Total numbers of working hours during last week in main occupation.

Table-A2: Descriptive Statistics of Quantitative Variables

Variables	Total	Minimum	Maximum	Mean	Std. Deviation
Age	17427	10	87	34.65	11.773
Total number of hours worked (last week)	17427	0	98	48.56	13.027

Table-A3: Descriptive Statistics of Binary Variables

Variables	Categories		Frequency	Percent
Migration Status	Non migrants		14680	84.2
	Migrants		2747	15.8
		Total	17427	100.0
Area of Work	Rural		5208	29.9
	Urban		12219	70.1
		Total	17427	100.0
Training Complete	No complete training		14812	85.0
	have ever complete training		2615	15.0
		Total	17427	100.0
Gender	Female		1895	10.9
	Male		15532	89.1
		Total	17427	100.0
Marital Status	Otherwise		5545	31.8
	Married and live with spouse		11882	68.2
		Total	17427	100.0
No Formal Education	Otherwise		14232	81.7
	Have no formal education		3195	18.3
		Total	17427	100.0

Variables	Categories		Frequency	Percent
Below Matriculation	Otherwise		12840	73.7
	Have education below matriculation		4587	26.3
		Total	17427	100.0
Matriculation but Below Intermediate	Otherwise		13919	79.9
	Have education matriculation but below intermediate		3508	20.1
		Total	17427	100.0
Intermediate but Below Degree	Otherwise		15264	87.6
	Have education intermediate but below degree		2163	12.4
		Total	17427	100.0
Degree Above	Otherwise		13453	77.2
	Have education degree above		3974	22.8
		Total	17427	100.0
Occupation	Otherwise		3354	19.2
	Working in Business, Industry or Office		14073	80.8
		Total	17427	100.0
Permanent Job	Otherwise		8515	48.9
	Have permanent job		8912	51.1
		Total	17427	100.0
Contract Job	Otherwise		15691	90.0
	Have contract job		1736	10.0
		Total	17427	100.0

Multilayer Perceptron Network

Table-A4 Case processing summary

Case Processing Summary			
		N	Percent
Sample	Training	12226	70.2%
	Testing	5201	29.8%
Valid		17427	100.0%
Excluded		0	
Total		17427	

Table-A5: Model Summary

Model Summary		
Training	Sum of Squares Error	3517.539
	Relative Error	.578
	Stopping Rule Used	1 consecutive step(s) with no decrease in error
	Training Time	00:00:02.552
Testing	Sum of Squares Error	1572.430
	Relative Error	.571

Table-A6: Parameter Estimates of Neural Network Model

Parameter Estimates											
		Predicted									
Predictor		Hidden Layer 1									Output Layer
		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)	H(1:6)	H(1:7)	H(1:8)	H(1:9)	Wages
Input Layer	(Bias)	-.089	.171	-.460	.218	.419	.484	-.484	-.144	.335	
	[Migration=0]	.071	.198	.543	-.432	.105	.268	.038	.088	.051	
	[Migration=1]	.329	.444	-.418	-.259	.426	-.199	-.152	-.032	-.040	
	[Area=0]	-.116	-.163	.247	-.451	-.590	-.020	-.348	.298	.375	
	[Area=1]	.495	.466	.174	-.327	.161	.449	-.225	-.414	-.428	
	[TC=0]	.492	-.296	.128	.522	-.246	-.311	.096	.093	-.386	
	[TC=1]	.481	.442	-.224	.330	-.136	.487	.388	.428	-.412	
	[Gender=0]	-.026	-.028	-.344	-.376	-.228	-.132	-.355	-.302	.481	
	[Gender=1]	-.403	-.365	.470	.576	-.339	.334	-.078	-.251	-.213	
	[MS=0]	.455	.243	-.098	-.041	-.242	-.356	-.064	.018	.110	
	[MS=1]	.228	-.352	-.383	.165	-.135	-.201	.085	-.137	.258	
	[NFE=0]	-.153	.209	.435	.000	-.182	.352	-.274	.437	.000	
	[NFE=1]	-.363	.266	-.105	-.514	-.263	-.328	-.527	.330	.426	
	[BM=0]	-.182	.111	-.183	.159	.386	-.090	.334	.086	.049	
	[BM=1]	-.081	.109	.230	-.081	.337	-.041	-.544	.212	-.102	
	[MBI=0]	-.147	.117	-.276	.367	-.544	.505	.038	.074	-.407	
	[MBI=1]	.260	-.271	.463	-.158	.282	.057	-.394	-.171	.180	
	[IBD=0]	-.218	.220	.471	.282	-.481	.402	-.442	.112	-.204	
	[IBD=1]	-.407	-.027	-.014	.232	-.328	-.064	.230	.427	-.110	
	[DA=0]	.294	-.094	.396	-.325	-.539	.019	-.574	-.517	.089	
	[DA=1]	.131	-.146	-.320	.005	.527	-.226	.364	.540	.404	
	[Occupation=0]	.390	-.220	.167	-.428	.133	.014	.306	-.188	.393	
	[Occupation=1]	.019	.051	-.474	-.487	.084	.353	.348	.084	-.432	
	[PJ=0]	.369	.346	.404	-.074	-.349	-.187	-.037	.201	-.451	
	[PJ=1]	-.135	-.219	.068	.179	.333	-.271	.016	.459	.021	
	[CJ=0]	.487	-.037	.194	-.043	-.178	-.048	.199	-.066	.142	
	[CJ=1]	-.175	-.489	-.315	-.314	.318	-.219	-.060	.507	.356	
	Age	.056	.455	.020	-.157	.388	.013	.400	.243	.357	
	THW	.370	.155	.396	.314	.041	-.342	-.095	-.403	.413	
Hidden Layer 1	(Bias)										.491
	H(1:1)										.076
	H(1:2)										.011
	H(1:3)										-.052
	H(1:4)										.419
	H(1:5)										.875
	H(1:6)										.134
	H(1:7)										.337
	H(1:8)										.331
	H(1:9)										.015

Figure-A1: MLP Network Illustration

Table-A7: Independent Variable Importance

	Importance	Normalized Importance
Migration Status	.029	9.5%
Area	.047	15.5%
Training Complete	.023	7.5%
Gender	.061	19.8%
Marital Status	.018	6.0%
No Formal Education	.054	17.6%
Below Matric	.035	11.3%
Matric but Below Inter	.037	12.2%
Inter but Below Degree	.039	12.8%
Degree Above	.186	61.0%
Occupation (Business Industry Office)	.008	2.5%
Permanant Job	.073	23.8%
Contract Job	.035	11.3%
Age:	.306	100.0%
total number of hours worked	.050	16.3%
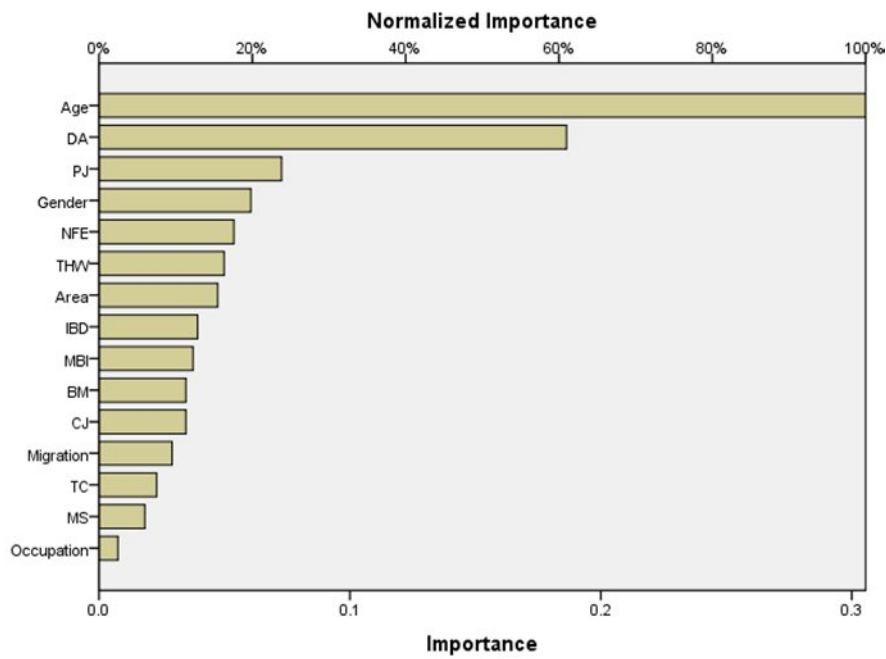
Figure-A2: Independent Variable Importance Chart

APPENDIX B

Prediction of Wages Using MLP Model Manually

To predict the wages of employee using MLP model, the values of independent variables and weights estimated by the model are required. The weights for hidden and output layer are given in table A6. As the model have three layers; input layer, hidden layer and output layer. So in first step hidden layer receives the weighted sum of incoming signals (information from independent variables) sent by the input layer and processes it in the hidden layer using Hyperbolic Tangent activation function $f(x) = \dfrac{e^x - e^{-x}}{e^x + e^{-x}}$. The hidden layer in turn sends an output signal towards the neurons in output layer. So processing on the weighted information received by the output layer is done on the same way as in hidden layer that is by applying an activation function on it. In this model output layer utilize an identity activation function $f(x) = x$, because wages is a scale dependent variable. In end model provide a rescaled value depends upon which type of rescaling method is utilized for the scale dependent variable. In existing architecture of the MLP standardized method is employed to rescale the variable. Detailed of this prediction processed is give the following, manual calculation for each layer is given below.

For illustration, let us consider the estimation of an employee. As stated above, for prediction the values of the independent variable are required. The values for independent variables for an employee are given in the following table. The weights for prediction will be used from table A6.

Variables	Values
Migration Status	1
Area of Working	1
Training Complete	0
Gender	1
Marital Status	0
No Formal education	0
Below Matriculation	1
Matriculation Below Intermediate	0
Intermediate Below Degree	0
Degree and Above	0
Occupation	1
Permanent Job	0
Contract Job	1
Age	60
Total working Hours	48

Calculations for Input to Hidden Layer

Let x_i denote the *ith* independent variable, w_{ij} denotes the weight of *ith* independent variable and the *jth* hidden layer node. Let y_j represent the *jth* node of hidden layer then in our case

$$y_j = bias + \sum_{i=1}^{n} w_{ij}x_i \; ; \qquad i = 1, 2, ..., n \text{ and } j = 1, 2, ..., 9$$

Now we calculate the results at each node of hidden layer.

For first node

$$y_1 = bias + \sum_{i=1}^{15} w_{i1}x_i$$

$= -0.089 + (1)(0.329) + (1)(0.495) + (0)(0.492) + (1)(-0.403) + (0)(0.455)$
$\quad + (0)(-0.153) + (1)(-0.081) + (0)(-0.147) + (0)(-0.218) + (0)(0.294)$
$\quad + (1)(0.019) + (0)(0.369) + (1)(-0.175) + (60)(0.056) + (48)(0.37)$
$= 21.215$

For second node

$$y_2 = bias + \sum_{i=1}^{15} w_{i2}x_i$$

$= 0.171 + (1)(0.444) + (1)(0.466) + (0)(-0.296) + (1)(-0.365) + (0)(0.243)$
$\quad + (0)(0.209) + (1)(0.109) + (0)(0.117) + (0)(0.22) + (0)(-0.094) + (1)(0.051)$
$\quad + (0)(0.346) + (1)(-0.489) + (60)(0.455) + (48)(0.155)$
$= 35.127$

For third node

$$y_3 = bias + \sum_{i=1}^{15} w_{i3}x_i$$

$= -0.46 + (1)(-0.418) + (1)(0.174) + (0)(0.128) + (1)(0.47) + (0)(-0.098)$
$\quad + (0)(0.435) + (1)(0.23) + (0)(-0.276) + (0)(0.471) + (0)(0.396) + (1)(-0.474)$
$\quad + (0)(0.404) + (1)(-0.315) + (60)(0.02) + (48)(0.396)$
$= 19.415$

For forth node

$$y_4 = bias + \sum_{i=1}^{15} w_{i4}x_i$$

$= 0.218 + (1)(-0.259) + (1)(-0.327) + (0)(0.522) + (1)(0.576) + (0)(-0.041)$
$\quad + (0)(0) + (1)(-0.081) + (0)(0.367) + (0)(0.282) + (0)(-0.325) + (1)(-0.487)$
$\quad + (0)(-0.074) + (1)(-0.314) + (60)(-0.157) + (48)(0.314)$
$= 4.978$

$$y_5 = bias + \sum_{i=1}^{15} w_{i5}x_i$$

$= 0.419 + (1)(0.426) + (1)(0.161) + (0)(-0.246) + (1)(-0.339) + (0)(-0.242)$
$\quad + (0)(-0.182) + (1)(0.337) + (0)(-0.544) + (0)(-0.481) + (0)(-0.539)$
$\quad + (1)(0.084) + (0)(-0.349) + (1)(0.318) + (60)(0.388) + (48)(0.041)$
$= 26.654$

$$y_6 = bias + \sum_{i=1}^{15} w_{i6}x_i$$

$= 0.484 + (1)(-0.199) + (1)(0.449) + (0)(-0.311) + (1)(0.334) + (0)(-0.356)$
$\quad + (0)(0.352) + (1)(-0.041) + (0)(0.505) + (0)(0.402) + (0)(0.019)$
$\quad + (1)(0.353) + (0)(-0.187) + (1)(-0.219) + (60)(0.013) + (48)(-0.342)$
$= -14.475$

$$y_7 = bias + \sum_{i=1}^{15} w_{i7}x_i$$

$= -0.484 + (1)(-0.152) + (1)(-0.225) + (0)(0.096) + (1)(-0.078)$
$\quad + (0)(-0.064) + (0)(-0.274) + (1)(-0.544) + (0)(0.038) + (0)(-0.442)$
$\quad + (0)(-0.574) + (1)(0.348) + (0)(-0.037) + (1)(-0.06) + (60)(0.4)$
$\quad + (48)(-0.095)$
$= 18.245$

$$y_8 = bias + \sum_{i=1}^{15} w_{i8}x_i$$

$= -0.144 + (1)(-0.032) + (1)(-0.414) + (0)(0.093) + (1)(-0.251) + (0)(0.018)$
$\quad + (0)(0.437) + (1)(0.212) + (0)(0.074) + (0)(0.112) + (0)(-0.517)$
$\quad + (1)(0.084) + (0)(0.201) + (1)(0.507) + (60)(0.243) + (48)(-0.403)$
$= -4.802$

$$y_9 = bias + \sum_{i=1}^{15} w_{i9}x_i$$

$= 0.335 + (1)(-0.04) + (1)(-0.428) + (0)(-0.386) + (1)(-0.213) + (0)(0.11)$
$\quad + (0)(0) + (1)(-0.102) + (0)(-0.407) + (0)(-0.204) + (0)(0.089) + (1)(-0.432)$
$\quad + (0)(-0.451) + (1)(0.356) + (60)(0.357) + (48)(0.413)$
$= 40.72$

Now we have to use the activation function tangent hyperbolic to obtain the results of each node from the hidden layer

For first node
$$\tanh(y_1) = \tanh(21.215) = -1$$

For second node
$$\tanh(y_2) = \tanh(35.127) = 1$$

For third node
$$\tanh(y_3) = \tanh(19.415) = 1$$

For forth node
$$\tanh(y_4) = \tanh(4.978) = 0.999905$$

For fifth node
$$\tanh(y_5) = \tanh(26.654) = 1$$

For sixth node
$$\tanh(y_6) = \tanh(-14.475) = -1$$

For seventh node
$$\tanh(y_7) = \tanh(18.245) = 1$$

For eighth node
$$\tanh(y_8) = \tanh(-4.802) = -0.99987$$

For ninth node
$$\tanh(y_9) = \tanh(40.72) = 1$$

Calculation for Hidden to Output Layer

Let z_k denote the result for k^{th} node of output layer.

$$z_k = bias + \sum_{j=1}^{9} w_{jk} \tanh(y_j)$$

In case of scale dependent variable number of nodes in output layer is one. Therefore the above equation takes the form

$$z = bias + \sum_{j=1}^{9} w_{jk} \tanh(y_j)$$

So
$$z = 0.491 + (1)(0.076) + (1)(0.011) + (1)(-0.052) + (0.999905)(0.419) + (1)(0.875)$$
$$+ (-1)(0.134) + (1)(0.337) + (-0.99987)(0.331) + (1)(0.015)$$
$$= 1.707003225$$

The activation function for output layer is identity so the value remains the same. But the MLP model provides the standardized value for the scale dependent variable. So to un-standardized this value utilizes $x = \mu + z\sigma$. Here μ and σ are obtained from the predicted values from the model to un-standardized the value. Now μ = 10547.80 and

σ = 6020.08. Thus un-standardized value is $\dfrac{1.71 - 10547.80}{6020.08} = 20824.1$.

So the estimated wage of employee is 20824 rupees. It is suggested that if data on these independent variable is available for the coming years one can easily predict the wage of an employee.

NEW ANALYTICAL DIMENSIONS BY USING WAVELETS

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ABSTRACT

In this paper we discuss the analytical aspects of wavelets in some problems. We can compute the moments of the upper record values from the Inverse Gaussian by using these techniques. We derive some basic properties as distribution function, survival function, hazard function and entropy for the inverse Gaussian distribution from upper record values. In the next phase, this paper suggests to determine the best linear unbiased estimators (BLUEs) for the mean parameter and shape parameter of inverse Gaussian distribution from upper record values. All these solutions can be obtained by wavelets.

1. INTRODUCTION AND LITERATURE REVIEW

Wavelet analysis was managed by Yves Meyer (a mathematician), Jean Morlet (a geophysicist) and Alex Grossman (a theoretical physicist). Due to their interest in time-frequency localization and multi-resolution analysis, they construct a structure and labeled their creation little wave which turn into "Wavelet" in English. Alfred Haar nearly about 1910 was constructed the first orthonormal basis after Fourier. And in the late 1940s, Dennis Gabor and John von Neumann developed the time frequency analysis. The use of the word "wavelet" initiates with the work by Jean Morlet and Alex Grossman in the 1970s. Meyer (1993) described about wavelet analysis and applications of wavelet methods. From here one can know how wavelets helpful in practice and presented basic mathematics with only one theorem. Wavelets have significant applications. Numerous people are now undertaking wavelets in many situations and gain advantageous results. The progress of wavelets is topical in applied mathematics and in applied statistics. Wavelet is a wavy function has assured mathematical properties. Wavelets are created from a particular "mother wavelet" function and provide useful functions.

Wavelet analysis is a modification of Fourier analysis. Fourier transform is a technique of describing an input function relating of its frequency components. Although Fourier methods are very good to selecting out frequencies from a signal containing of various frequencies, but they completely unable of dealing accurately with a signal that is varying over time. Various methods of Fourier analysis have been established to consent analysis of the frequency content of a signal at each time. Little success has been attained but these Fourier methods are not utterly reasonable. They can localize instantaneously in time and in frequency, but the extent of localization in time and in frequency leftovers stable. With wavelets, the extent of localization in time and in frequency is habitually modified. The utmost significant advantage of wavelets over other methods is its localization property. Statistical functions depend on certain assumptions about smoothness of the function being estimated. By wavelets, such assumptions are relaxed

significantly. Wavelet methods are also advantageous in non-parametric regression. Wavelets have multi-resolution analysis e.g. object can be observed widely with different levels of concentration.

Wavelets have ensuing applications with the statistical analysis. The most corporate application of wavelets is in signal processing. A signal is a numerical quantity acquired electronically. A signal could be weather evaluations, a transistor recording etc. Signals are tainted by random noise and an imperative part of signal processing is secretarial for this noise. A particular importance is on de-noising. This endeavor is indeed the objective in statistical function, to smooth the noisy data points to obtain an assessment of the original function. Wavelets have a significant advantage in signal processing is the related fast algorithms faster even than the fast Fourier transform. Wavelet have also used in image analysis that is a special case of signal processing. Again the random noise is included with the observed image so the main objective is again de-noising. In image processing transform a noisy image into a good-looking image. Likewise in statistics it is essential that the estimated functions have a good appearance or they should be smooth. The aim in data compression is to transform a massive data set saving only the most important features of the transformed data, thus it can be reassembled later with only a minimum of loss. By wavelets, a huge data set can offer be precised fine with only a moderately small number of wavelet measurements. Wavelets are the best for summarize data due to the following properties as

- Good time frequency localization
- Fast algorithms
- simplicity of forms

Rioul and Vetterli (1991) gave an elementary introduction concentrating on the signal processing uses of wavelets. Lee, A. Barford, R. Shane, F. and David R. smith (1992) provides an overview of the wavelet transform from an intuitive standpoint. They made comparisons of wavelet over Fourier series with examples. Ingrid Daubechies (1992) constructed a family of closely supported orthonormal bases with arbitrary regularity or number of vanishing moments. Graps (1995) defines wavelets, giving some historic background and describing several applications. Jawerth and Sweldens (1994) give a comprehensive overview of applied and mathematical features of wavelet analysis. Block (1992), Bock and Pliego (1992) and Vidakoric and Muller (1994) discuss statistical problems relating to the applications of wavelets. There are many books as Daubechies (1992), Chui (1992), Kaiser (1994), on higher mathematical foundations of wavelets. R. Todd ogden (1997) gave detailed discussion in his book how wavelets uses in statistics and data analysis. Felix Abramovich, Trevor C. Bailey and Theofanis Sapatinas (2000) established some basic mathematical background and terminology relating to wavelets. They discussed application of wavelets in statistics and including their use in nonparametric regression, density estimation, inverse problems, change point problems and some special aspects of time series analysis. Feasible extensions to the use of wavelets in statistics are made. They also include a brief reference of voluntarily existing software packages for wavelet analysis. Yazhen Wang (2005) gives a brief review on wavelet methodologies developed in past fifteen years. Various wavelet methods are used for different statistical problems. Anestis Antoniadis (2007) discussed various wavelets methods in statistics. Some recent development of wavelets methods and its applications

are discussed. Most of these methods are fitted into the general concept of regularization with properly chosen penalty functions. Partial linear regression models and functional index models are also discussed. The usefulness of these methods are illustrated by practical examples. M. Chazvini, S.A. Monad, N. Morahhedinic and K. Jamshidi (2009) offered a method to classify normal and defective tiles using wavelet transform and different neural networks. They proposed algorithm to calculate medians as well the standard deviation and average of detail images obtained from wavelet flitters.

2. DISCUSSION

Wavelet is used for orthonormal basis functions generating by dilation and translation of inefficiently supported scaling function, named father wavelet, φ, and a mother wavelet, ψ, associated with an r-regular multi-resolution analysis. Wavelets have many types of families that associate compact support with various degrees of smoothness and number of vanishing moments. And now these are the most widely used wavelet families in applied statistics. Wavelets are applicable in fast algorithms for integral transforms, in image and function representation methods. Image and function representations methods roused interest in wavelet applications to statistics and to the analysis of the experimental data.

Two main types of wavelet transform exist as continuous and discrete wavelets. Computer programs use the discrete wavelet transform due to their discrete nature. The discrete transform is very competent from the computational point of view. Wavelet function is used to indicate either orthogonal or non-orthogonal wavelets. And the word wavelet basis is used to indicate an orthogonal set of observations. Using orthogonal basis denotes the use of the discrete wavelet transform, whereas non-orthogonal wavelet function can be used with either the discrete or the continuous wavelet transform. In orthogonal wavelet analysis, the number of convolutions at each scale is proportional to the width of the wavelet basis at that scale. This produces a wavelet continuum that has discrete blocks of wavelet power and is suitable for signal processing. On the contrary, when the continuum at adjacent times is highly correlated then non-orthogonal wavelet analysis is highly dismissed at large scales. The non-orthogonal transform is advantageous for time series analysis where smooth, continuous differences in wavelet generosity are expected. Wavelet transform have useful applications in non-parametric regression, denoising or density of large imaging datasets in various other applications.

Wavelets can be used as refinement of Fourier transform. Windowed Fourier Transform (WFT) is an inaccurate and inefficient method for time-frequency localization. The inaccuracy raises from the aliasing of high and low frequency array of the window. In such situations we prefer wavelet transform over Windowed Fourier Transform (WFT).

A wavelet family is attained by dilation and translation of a closely supported mother wavelet ψ with zero integral over time $\int \psi(t)dt = 0$

$$\psi_{j,k}(t) = \frac{1}{\sqrt{2^j}} \psi\left(\frac{t - 2^j k}{2^j}\right)$$

and by dilation and translation of a father wavelet or scaling function φ with unit integral over time $\int \varphi(t)dt = 1$

$$\varphi_{j,k}(t) = \frac{1}{\sqrt{2^j}} \varphi\left(\frac{t - 2^j k}{2^j}\right)$$

where $j = 1, 2, 3, \ldots, J$ catalogs the scale $S_j = 2^j = 2, 4, \ldots, 2^J$ to which the wavelet has been dilated and $k = 1, 2, 3, \ldots, K = N/2^j$ catalogs listing the position in time or space to which it has been translated. Wavelets are notable by their smoothness or consistency, which is closely associated to the number of vanishing moments R. The number of vanishing moments of a mother wavelet ψ is defined to be the largest integer R that satisfies $\int t^r \psi(t)dt = 0$, where $r = 0, 1, 2, \ldots, R-1$.

$$\varphi(t) = \begin{cases} 1, & , 0 \le t \le 1 \\ 0, & , otherwise \end{cases}$$

$$\psi(t) = \begin{cases} 1, & , 0 \le t < \frac{1}{2} \\ -1, & , \frac{1}{2} \le t \le 1 \\ 0, & , otherwise \end{cases}$$

The wavelet transform involves in our work in the following way. In our work we have problems of large integrals that are unsolvable, so we need techniques that can solve these integrals numerically. We derived the expressions of the moments, skewness, kurtosis, cumulative distribution function, survival function and hazard rate for the inverse Gaussian distribution from the upper record values. It is not possible to derive the exact formulas of these expressions, so we needed some techniques to find the numeric results of these expressions.

After that we moved to inverse Gaussian distribution record values and associated inference. The mean, variance, covariance's and other properties of the inverse Gaussian distribution from the upper record values cannot be solved exactly, so we have to find the numeric results of these expressions for different values of parameters of the inverse Gaussian distribution from the upper record values. Then we computed the BLUE's of the parameters of the inverse Gaussian distribution from the upper record values and then derive the results of variance , covariance's of these BLUE's parameters numerically.

To find the solution of all of these problems we needed some computer techniques that can solve them numerically. The literature of wavelet provides best solutions for the problems like that. So we are using wavelet analysis for the inverse Gaussian distribution from the upper record values.

3. CONCLUSION

In this paper we discuss the analytical dimensions of wavelets. We are considering the problem of the upper record values from the inverse Gaussian distribution. For n and m greater than one it is difficult to derive exact formulas for single and double moments of inverse Gaussian upper record values, so wavelet techniques will be used to find these moments. The basic properties of inverse Gaussian distribution from the upper record values as skewness, kurtosis, distribution function, survival function, hazard function and entropy can be derived by these techniques. We will compute BLUEs of inverse Gaussian distribution from the upper record values and variances and covariance's of these BLUEs by using the numerical results of moments. No work has been done on inverse Gaussian distribution from record values due to these problems, now we are working on it. The problems occurred like that can be solvable by using wavelets. Optimistically this will be a great involvement in the area of wavelets uses.

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PREDICTION OF CONSUMER DECISION MAKING
(A CASE OF MEDICAL MARKET OF GUJRAT)

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ABSTRACT

Understanding consumer behavior in any market is difficult but in healthcare it is more challenging because healthcare market is very personal and sensitive in nature that naturally relies on trust and personal recommendations. In selection of a health plan or doctor the consumer first choice for provider involve number of factors including reputation (often based on word-of-mouth from friends and family) qualification, behavior and office atmosphere. In this study we predict the decision making of consumer on the bases of considered factor. We identify decision making in two categories yes and no either people make their decision on the bases of considered factors or not. The questionnaires were distributed to 400 respondents. Data collected from students, faculty and administrative staff of the University of Gujrat (Hafiz Hayat Campus). Multilayer Perceptron Neural Network Model is used for predicting the chance of decision making. Word-of-mouth communication, perceived risk, opinion leaders, communication medium, personal information source, social structure, family income are used as independent variable in the model. The result of this study reveals that word-of-mouth; personal information source, opinion leaders, social structure, family income, perceived risk and communication medium are as an important predictor respectively.

KEYWORDS

Healthcare Market, Decision Making, Word-of-Mouth, Multilayer Perceptron Neural Network.

1. INTRODUCTION

The consumer behavior is very important for the marketers. Main part of consumer behavior is decision making which used making in purchase. Understanding consumer behavior as a sequential decision making process is one that is common in marketing [Assael (1992)]. This decision making process is affected by a number of factors. Some of these factors are related to the environment in which the decision is made (Social Factors) while others are related to individual who make the decision (Personal Factors) .The consumer's decision to buy or not a product or service is main l factor for the marketers. It can indicate whether a marketing plan has been successful or not. Hence, marketers are much interested in the consumer's decision making process. These days, for a consumer there is possibly more than one option or alternatives available for making decision. This reflects the difficulty in the consumer decision making. With the passage

of time, the purchase decision is becoming difficult for the consumers. Therefore, the marketers are in the continuous search to investigate the factors that influence consumer to make their purchase decision. Understanding consumer behavior in any market is difficult, but in health care is mainly not easy for several reasons. Because people are more conscious about their health and also it consists series of visit. So mostly they take their decision on the basis of social and personal factors.

Word-of-mouth marketing is defined as the sharing of information from one person to another person. Arndt (1967) defined word-of-mouth as oral communication between a sender and a receiver whether the receiver perceives as noncommercial regarding a brand, a product or a service. Bansal and Voyer (2000) indicated that customer's reliance on informal communication in making purchase decision as compare to advertising campaigns.

In marketing literature, word-of-mouth is usually engaged to illustrate information from other experienced people. In consumer preference, word-of-mouth is often the dominant factor [East, Hammond and Wright (2007)].

Rising lack of trust in advertising communications has made customers to find out information from other resources so mostly customers trust on word-of-mouth [Allsop, et al. (2007)]. Consumers think that the people they know and have relationship they concern about their best interest while marketers are having a financial interest [Dichter (1966)]. Considering word-of-mouth is becoming more important because, traditional forms of communication show to be losing effectiveness. Goyette et al. (2010) acknowledged that word-of-mouth is also almost certainly the oldest means of exchanging opinions on various goods and services

Allsop, et al. (2007) find that in 2006 U.S.A consumers were in search of for information sources that is helpful when deciding which products to buy in common product categories. Word-of-mouth from friends and family were the most significant sources for purchasing fast food, cold medicine, and breakfast cereal. Selection of doctor is very sensitive and it is consist of series of visit therefore peoples are very selective and seek word-of-mouth information from others. People too use this tool while making a decision does get some opinions from their inner circle. The results of this study improve our understanding that whether these social and personal factors influences making decisions particularly in the health service sector. Doctors and hospitals have limited options to make their advertising so word-of-mouth may be useful and influential advertising technique for hospitals advertisement. This study is helpful to the doctors or hospital management for their advertising in the society. This research will provide clear dimensions and guidance to promote, retain and attract the new customers. On the other hand this will also facilitate the patients to select the most appropriate medical facility based on the prevailing information and trust base knowledge of the health care industry.

1.1 Objectives

1. To predict the chance of Consumer Decision Making based on consider factors in medical market.
2. To investigate the relative importance of factors with respect to decision making in medical market.

1.2 Factors of Effective Decision Making
Following are the factors of decision making.

1.2.1 Perceived Risk (PR):
Perceived risk has been distinct as negative or harmful consequences that can occur from the purchase of a product or services [Bauer (1967)]. There are different types of perceived risk such as financial, social, psychological, time, functional and security risk. Health is very important for the human they cannot take risk so sometimes people give priority to the financial issues or others while selecting doctor or medical service.

1.2.2 Personal Information Source (PIS):
Personal information source includes person's personal effort to collect information for the selection of the doctors for particular disease. He/she search information from different channels for example bulletin boards, news papers, pamphlets regarding doctors and make their decision on the basis of that information.

1.2.3 Opinion Leaders (OL):
An opinion leader is those who lead the opinion of others people and give the opinions to the individuals. Opinion leader include convincing personality to convince others, more knowledgeable and aware people. Selection of doctor is very sensitive and consist series of visit so people take information from opinion leaders. Others opinion often shape our decision so it is very important factor for decision making.

1.2.4 Communication Medium (CM):
We often influenced by information that we get from different type of electronic medium. Advertisement from different electronic medium plays important role in our decision making. Especially in selection of doctor decision we often convinced through advertisement play by cable or radio.

1.2.5 Word-of-Mouth (WOM):
Word-of-mouth is defined as the sharing of information from one person to another .If actively sought word-of-mouth then it has greater impact on the decision. Arndt (1967) stated that actively sought word-of-mouth were very important element in decision making process. Receiver's participation towards word-of-mouth is very important element in decision making. Since if a message is actively sought then it have greater influence on decision.

1.2.6 Social Structure (SS):
Social structure based on the information that we get from friends, family and other people in our society. It includes that person to which we can easily share our personal experiences. Friends, peers and family member's preferences about doctor are more influential. So we can say that social network have great effect on decision.

2. LITERATURE REVIEW

This part focuses on literature that is reviewed from the past studies conducted at different years. To understand decision making there are many studies in which different factors are discussed

Bansal and Voyer (2000) conducted a study to examine the effect of word-of-mouth on buying decision. They also observed the influence of non interpersonal forces

(receiver expertise, receiver perceived risk and sender expertise) and interpersonal forces (ties strength and actively sought word-of-mouth) on word-of-mouth for a buying decision. And also inspect the process of word-of-mouth for a buying decision. Questionnaire was used to collect the data. Exploratory factor analysis, confirmatory factor analysis and reliability analysis were used. The results indicate that that non interpersonal forces and interpersonal forces have great effect on word-of-mouth for a buying decision.

Wangenheim and Bayon (2004) conducted a study to find the situation in which word-of-mouth effect on to purchase or not purchase decision. Sample was taken from the two populations. Path model and logit model were used for analysis. Result indicated that word-of-mouth powerful force that effect consumer decision. The expertise of source from which take word-of-mouth and similarity between receiver and sender have great influence on decision.

Snipes, Ingram and Jiang (2005) conducted a study to investigate the how individual consumers may vary in their information search behavior in health care decision-making. Results of study indicate that most consumers still use word-of-mouth as a major information source for health care decisions. However, usage of the Internet is increasing. The results of this study indicate that consumers who are most likely to use the Internet for health care information are single, younger, and less educated, whereas consumers who are most likely to use word-of-mouth are middle-aged, married, with higher income and higher education. Surprisingly, no significant gender difference was found in information search behavior for health care decision-making. The result also suggested that people are more used word-of-mouth rather than internet.

Murphy, Mascardo and Benckendorff (2007) conducted a study to examine the importance of word-of-mouth information in the travel decision-making process. Friends and relatives word-of-mouth were very reliable source for the selection of destination. The study examined the effect of family, friends and other traveler's word-of-mouth on the traveling decision. In this study four groups of respondents were compared. In first group those people who obtained travel information from friends and relatives and from other travelers in the second group those who obtained information from friends and relatives and in third group who obtained information from other travelers and in fourth those who obtained information from no source (no word-of-mouth). Data were collected from 413 visitors from the North Queensland Region in Australia. For the analysis of the data discriminate analysis and factor analysis were used. The results indicated four groups were significantly different with respect to demographic characteristics, other information sources used accommodation and transportation used, and travel activities in the destination.

Chaniotakis and Lymperopoulos (2009) conducted a study to examine the effect of service quality on satisfaction and word-of-mouth for maternities in Greece. Based on Parasuraman, et al. SERVQUAL variables they tried to identify the effects of each variable to satisfaction and word-of-mouth. Data were collected through from the 1,000 mothers who have given birth to a child during the last five years and the data were analyzed using SEM. The results recommend that, satisfaction and empathy that directly affects word-of-mouth.

Shehzad et al. (2010) conducted a research on the impact of word-of-mouth on patient satisfaction. The main objective was to evaluate the elements of services that are provided in Pakistan hospitals Public and Private and their role into patient satisfaction. Questionnaire is used to collect the data. The analysis was based on a survey of patient in public and private hospitals in Islamabad, Pakistan. Correspondence analysis was applied. Correlation and regression analysis were used to find out the impact of Service quality, Word of mouth and Trust on patient's satisfaction. It was found that patients' satisfaction is influenced by the service quality provided by the hospital industry.

Aslam, et al. (2011) examined the effect of negative and positive word of mouth marketing on consumer buying behavior. The study was based on primary data collected from one hundred households and university students from the area of Rawalpindi and Islamabad cities of Pakistan. The data was analyzed using the techniques of frequency distribution and ranking. The result showed that consumers rely on word of mouth for the purchase of everyday items as well as long-term goods. The people that appear to had an influence on the decision of the consumers the most were closed family, friends and contacts. Results further explored that a harsh experience of a product/place could create problems for the business as it was a major factor of negative word of mouth. Lastly the result also showed that negative word of mouth activities faster than positive comments.

3. DATA AND METHODOLOGY

3.1 Source of Data:

Population of study in hand includes all students of Social Sciences, CS&IT and Management Sciences, Faculty and Administrative staff of University of Gujrat in Hafiz Hayat Campus. The total population size is our selected campus is 3269. We calculate sample size as

$$n = \frac{N}{1 + Ne^2} = 400 \qquad\qquad \text{(Yamne, 1967)}$$

Population size N = 3269

Margin of error e = 0.05

Two-Stage Stratified random sampling design will be used for selecting a sample from the sampled population. In first stage stratified random sampling we have used equal allocation and at the second stage proportional allocation method used. Firstly for total sample of 400 respondents, we have selected 200 students and 200 faculty and administrative staff. By proportional allocation we will select 56 students' from 831 students of BBA, 62 students from 901 students of CS&IT and 82 students from 1189 students of social sciences. We will select 63 employees of administrative from 109 and 137 faculty members from 239 of University of Gujrat. There was 25% non response received from faculty and administration staff (58 out of 63 & 92 out of 137 from administration and Faculty respectively). The total sample of 350 was collected for the analysis.

3.2 Study design:

We will take a data from any respondent at a single time point so cross sectional study design will be used.

3.3 Research Instrument:

A well-structured questionnaire will be used as research instrument for data collection**. There are 38 items using a 5-point Likert-Scale.**

3.4 Data Analysis Techniques:

Artificial Neural Network Models:

An Artificial Neural Network (ANN) is an information processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information. The key element of this paradigm is the novel structure of the information processing system. It is composed of a large number of highly interconnected processing elements (neurons) working in unison to solve specific problems. ANNs, like people, learn by example. An ANN is configured for a specific application, such as pattern recognition or data classification, through a learning process.

Neural network model from the past few years have been used extensively. They are being used over a wide range of different problems, broadly and efficiently. Engineering, medicine, finance physics are some area in which neural network model are significantly used.

Multilayer Perceptron (MLP):

The MLP is an example of Artificial NN and it is the most popular architecture that is used today. It is feed-forward, supervised learning network and function of one or more independent variable (input or predictors) that minimize the error of prediction of one or more dependent variable (output variables). Independent and dependent can be mix of categorical and scale variable. An MLP network is composed of units organized in layers and each layer is considered of nodes. Each unit in a given layer connects to ever unit in subsequent layers hence it is fully connected network. Information flows through each element in an input-output manner.

The following diagram illustrates a Perceptron network with three layers:
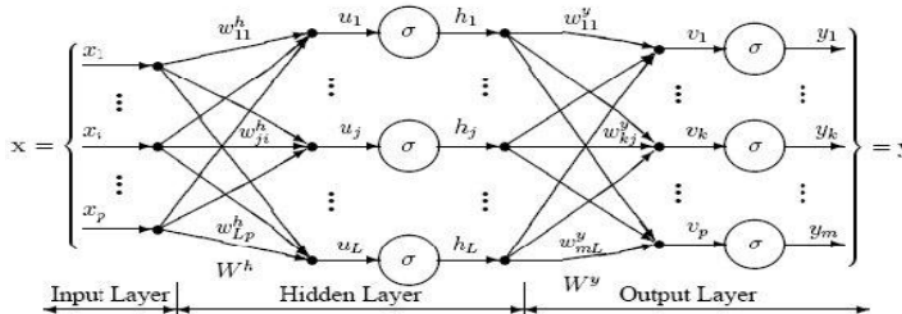
This network has an **input layer** (on the left) with three neurons, one **hidden layer** (in the middle) with three neurons and an **output layer** (on the right) with three neurons. There is one neuron in the input layer for each predictor variable ($x_1…x_p$). In the case of categorical variables, N-1 neurons are used to represent the N categories of the variable.

Input Layer: The input layer distributes the values to each of the neurons in the hidden layer. The input layer (or processing before the input layer) standardizes these values so that the range of each variable is -1 to 1.

Hidden Layer: the hidden layer is in between the input layer and output layer where an activation function is used to manipulate the information obtained from the input layer. The outputs from the hidden layer are distributed to the output layer.

Output Layer: The output layer is concluding layer to the NN architecture. This layer also receives the weighted sum of inputs from the hidden layer and utilizes an activation function to produce a value from network.

Activation Function: The activation function "links" the weighted sums of units in a layer to the values of units in the succeeding layer. Activation function can be of different types.

Identity: This function has the form: $\gamma(c) = c$. It takes real-valued arguments and returns them unchanged. When automatic architecture selection is used, this is the activation function for units in the output layer if there are any scale-dependent variables.

Sigmoid: This function has the form: $\gamma(c) = 1/(1+e^{-c})$. It takes real-valued arguments and transforms them to the range (0, 1).

Hyperbolic tangent: This function has the form: $\gamma(c) = \tanh(c) = (e^c - e^{-c})/(e^c + e^{-c})$.

It takes real-valued arguments and transforms them to the range (–1, 1). When automatic architecture selection is used, this is the activation function for all units in the hidden layers

Softmax activation: This function has the form: $\gamma(x_k) = e^{x_k} \Big/ \sum_{j=1}^{h} e^{x_j}$ It takes real-valued arguments and transforms them into the range (0, 1) and sum to 1. Softmax is available only if all dependent variables are categorical. When automatic architecture selection is used, this is the activation function for units in the output layer if all dependent variables are categorical.

4. RESULT AND DISCUSSION

The Multilayer Perceptron Neural Network is applied to predict or estimate the chance of respondent decision making on the considered factors. It is also investigated that which independent variable are playing important role for the prediction. We have used SPSS16 for applying neural network model on the data it automatically divides the cases into two parts one is for training and other for testing the model.

In MLP analysis Table 1 shows that 233 cases were assigned to training sample and 110 cases to the hold out sample. The 7 cases were excluded from the analysis due to missing values. No of units in the input layer are 7. One variable is entered in the analysis is factor. Seven variables that are entered in the analysis are covariates

Figure 1 is the graphical representation of the MLP neural network. As it is mentioned in earlier section that MLP network is consist of three layers and it can be seen in the given picture. The number of nodes in the first layer are equal to the number of

independent variables and bias so input layer contains the 8(7 predictors + bias) nodes. Second layer contain 8 nodes and in the last layer numbers of nodes are equal to the number of categories in the dependent variable that is 2. The network automatically select hyperbolic tangent function for the hidden layer to link the weighted sum of values with the next layer (output layer) and Softmax activation function is applied to the output layer to produce the resulting value. Blue and grey lines show relationship between input, hidden and output nodes, and these relationships are estimated in the form of weights. Grey lines show positive weights and blue lines show negative weights. Figure 1 depicts that category 1 (No) has strong positive relationship with node 2 and strong negative relation with node 4, 7 of hidden layer. Category 2 (Yes) has strong positive relationship with node 6, 7 and strong negative relationship with node 3, 5 of hidden layer. As in the parameter estimation Table 2 for first category weight for node 2 are positive and 4,7 have negative values of the weights.

The classification matrix provides a complete picture of the classification performance of model. The ideal classification matrix is the one in which the sum of diagonal is equal to the number of samples. Cells on the diagonal of cross- classification are correct classifications. Cells off the diagonal of the cross-classification are incorrect classifications. Table 3 showed the classification results of analysis. 28 of the cases 58 who actually belong to category 1 (no) are classified correctly in training sample. 165 of the 175 who actually belong to category 2 (yes) are correctly classified in training sample. 82.8 % of the training cases are correctly classified. 17.2% cases of the training sample are incorrect classified. 15 of the cases 27 who actually belong to category 1 are classified correctly in hold out sample. 78 of the cases 83 who actually belong to category 2 are classified correctly in hold out sample. 84.5% of the hold out cases is correctly classified.

The Receiver Operating Characteristics (ROC) curve is also very helpful for accessing the accuracy of the model. It gives you a visual display of the sensitivity and specificity for all possible cut offs in a single plot, which is much cleaner and more powerful than a series of tables. The area under the curve is useful summary statistic to identify the accuracy of any MLP model. The closer the area is 0.5, the less accurate the corresponding model is. A test with perfect discrimination has a ROC curve the passes through the upper left corner. In Figure 2 chart has two curves, one for the category No and one for the category Yes. In this graph that curves pass through upper left corner which close to 1 and covers the area 82% so there is high accuracy of the model. Area under the curve is close to 1.0 for each category so model is precise. Table 4 depicts the area under the ROC curves. Area under the curve is approximately close to 1.0 for each category so model is good.

The cumulative gains chart displayed in Figure 3 shows the percentage of the overall number of cases in a given category "gained" by targeting a percentage of the total number of cases. For example, the first point on the curve for the No category is at (10%, 32%), meaning that if you score a data set with the network and sort all of the cases by predicted pseudo-probability of no category. You would expect the top 10% to contain approximately 32% of all of the cases that actually take the category No. Likewise, the top 20% would contain approximately 55% of the cases that actually take the category No.

Table 5 shows the predicted value for decision making. Through this table we can say that 83% percent in our population make their decision on the bases considered factors. The importance of independent variable can be visualized by from the table 6 and figure 4. The importance of an independent variable is a measure of how much the predicted value of the model changes for diverse value of the predictor. Whereas by dividing the each importance value to the largest importance value gives the normalized importance and then multiplied by 100 to express this in percentages. The importance chart is simply a bar chart of the values in the importance table, sorted in descending value of importance. The normalized importance chart show in Figure 4. It appears that variable word-of-mouth, personal information source an important variable to prediction of the model on the bases of dependent variable. By using Neural Network we predicted approximately all the cases correctly

The manual calculation and further detail of MLP model to predict the decision making of a respondent is also given in Appendix. The purpose of this manual calculation is that by using this model one can predict decision making for selection of doctor when independent variables are given.

5. CONCLUSION

In this study we develop the MLP model that can be used to predict the decision making of respondent of University of Gujrat. From predicted value of the decision making we can say that all the factors have effect on decision making. Doctor should be considered these factors for their advertisement. The second objective of the study is to examine the relative importance of the independent variable that has an effect on decision making of people. It is noted that word-of-mouth play more important role in respondent decision making for selection of health care services. And communication medium is less important as compare to the other independent variables. Finally we have achieve our objective, as the developed MLP model is given in the appendix and through relative importance of these predictors we can be concluded that people in our population are more relay on word-of-mouth information for the selection of doctor. It can also be concluded that word-of-mouth is powerful marketing technique and doctor can use for their personal marketing. Word-of-mouth has been accepted as a powerful force affecting consumer choice, loyalty and switching a product or service. Doctors and hospitals have limited options to make their advertising so word-of-mouth may be useful and influential advertising technique for hospitals advertisement.

6. APPENDIX

Table 1: Case Processing Summary

		N	Percent
Sample	Training	233	67.9%
Testing		110	32.1%
Valid		343	100.0%
Excluded		7	
Total		350	
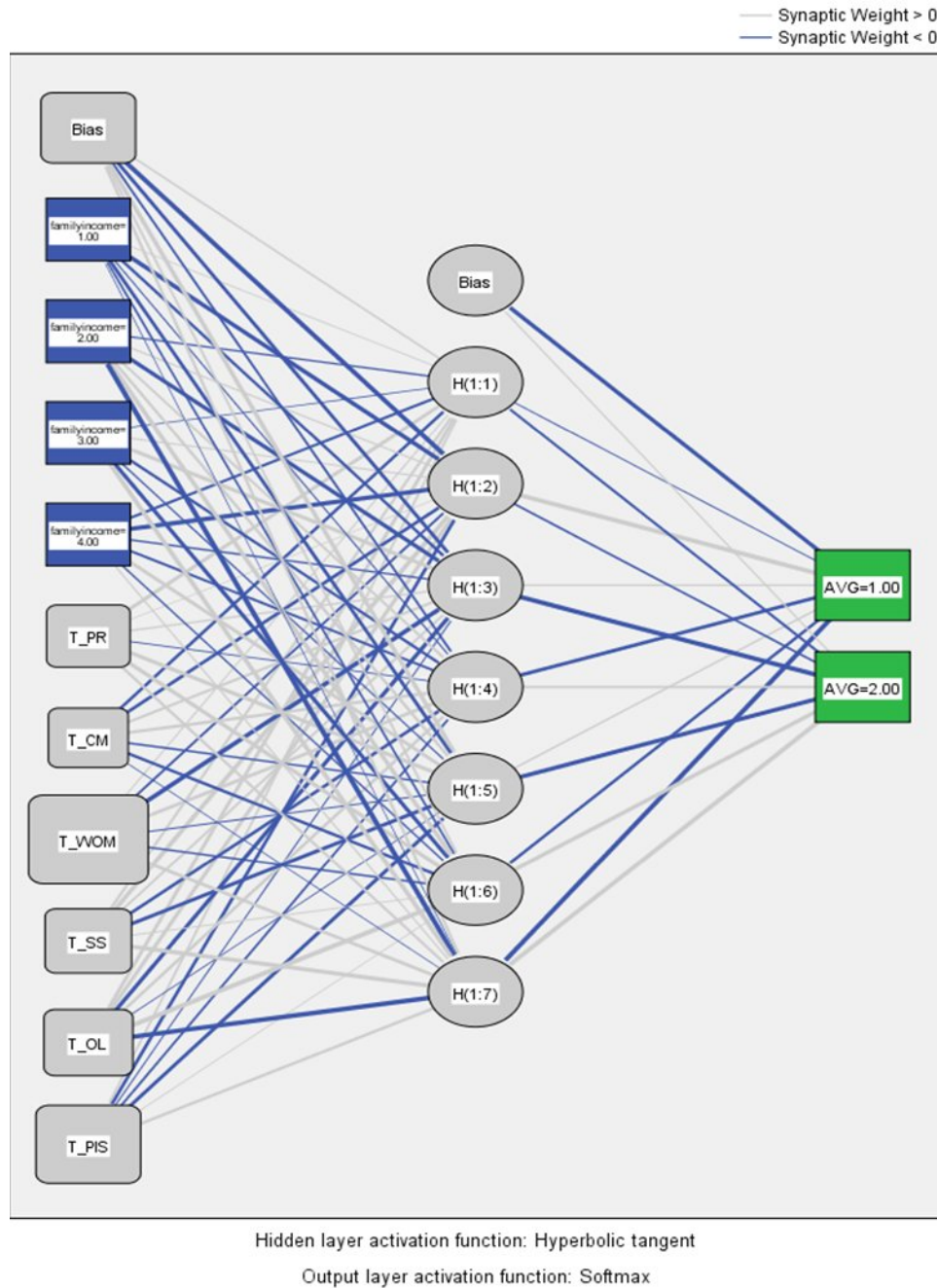
Fig. 1: Neural Network Mod

Table 2: Parameter Estimates of Neural Network

Predictor		Predicted									
		Hidden Layer 1							Output Layer	
		H(1:1)	H(1:2)	H(1:3)	H(1:4)	H(1:5)	H(1:6)	H(1:7)	DM_No=1	DM_Yes=2
Input Layer	(Bias)	.174	-.865	-.419	-.233	.651	.232	.309		
	[family income=1.00]	.070	-.663	-.328	-.104	-.406	-.197	-.007		
	[family income=2.00]	-.145	.143	-.601	.248	.318	.655	-1.256		
	[family income=3.00]	-.042	.114	.562	-.321	-.124	-.574	.708		
	[family income=4.00]	-.316	-.853	-.148	-.269	.430	-.145	.126		
	T_PR	.454	.015	.151	-.073	.577	.586	.302		
	T_CM	-.353	-.405	.302	.381	-.173	-.351	-.027		
	T_WOM	.108	-.237	-.729	.410	-.099	-.188	.406		
	T_SS	.293	.727	.238	-.384	-.561	.085	.703		
	T_OL	.426	.548	-.600	.370	-.066	1.074	-1.084		
	T_PIS	.205	-.403	-.089	-.213	-.487	.067	.344		
Hidden Layer 1	(Bias)								-.640	.139
	H(1:1)								-.075	-.284
	H(1:2)								.858	-.203
	H(1:3)								.146	-.992
	H(1:4)								-.511	.278
	H(1:5)								.154	-.726
	H(1:6)								-.337	.629
	H(1:7)								-.921	.836

Table 3: Classification Results of Neural Network

Sample	Observed	Predicted		
		NO	YES	Percent Correct
Training	No	28	30	48.3%
	Yes	10	165	94.3%
	Overall Percent	16.3%	83.7%	82.8%
Holdout	No	15	12	55.6%
	Yes	5	78	94.0%
	Overall Percent	18.2%	81.8%	84.5%
Dependent Variable: Decision Making in Categories				

Dependent Variable: Decision Making AVG
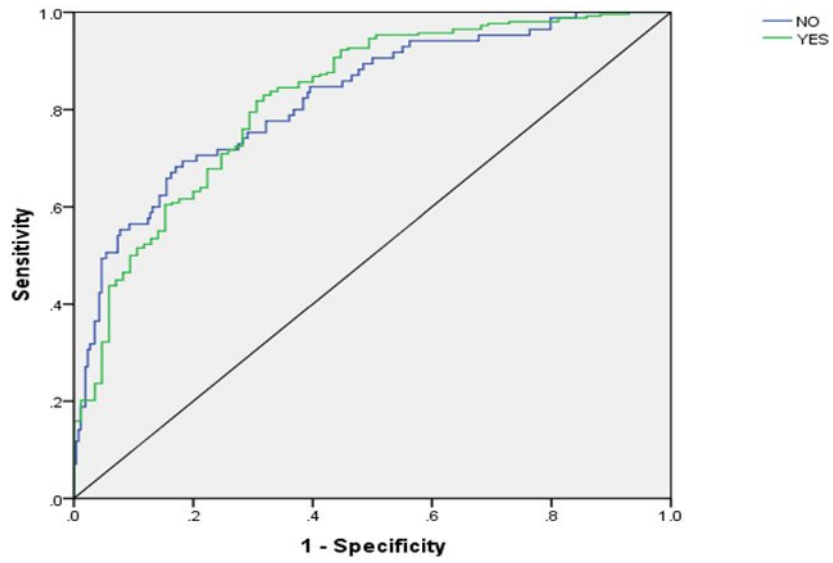
Fig. 2: ROC Curve

Table 4: Areas under the Curve

		Area
Decision Making based on Word-of-mouth	No	0.822
	Yes	0.822

Dependent Variable: Decision Making AVG
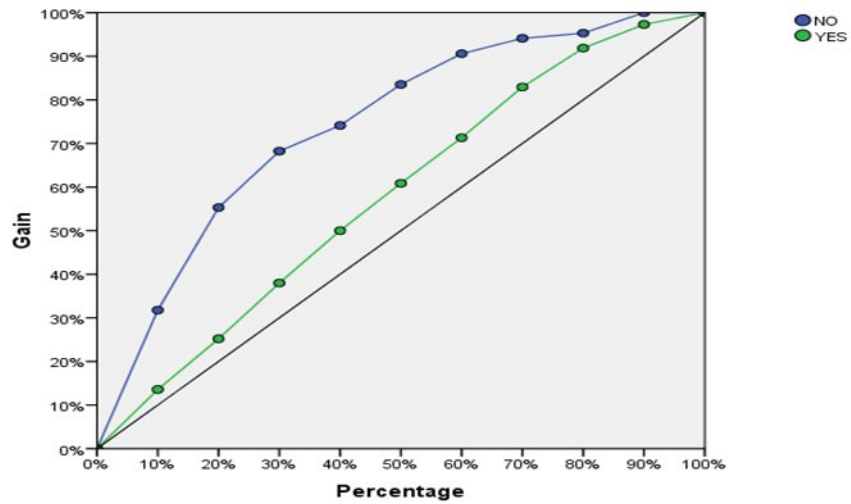
Fig. 3: Gain Chart

Table 5: Predicted Value for Decision Making

		Frequency	Valid Percent
	NO	58	16.9
Valid	Yes	285	83.1
	Total	343	100.0
Missing	System	7	
Total		350	100.0

Table 6: Independent Variable Importance

	Importance	Normalized Importance
Total Score of Word-of-Mouth	.313	100.0%
Total score of Personal Information Source	.220	70.1%
Total Score of Opinion Leader	.121	38.6%
Total Score of Social Structure	.105	33.6%
Family Income	.091	29.1%
Total Score of Perceived Risk	.087	27.6%
Total Score of Communication Medium	.063	20.1%
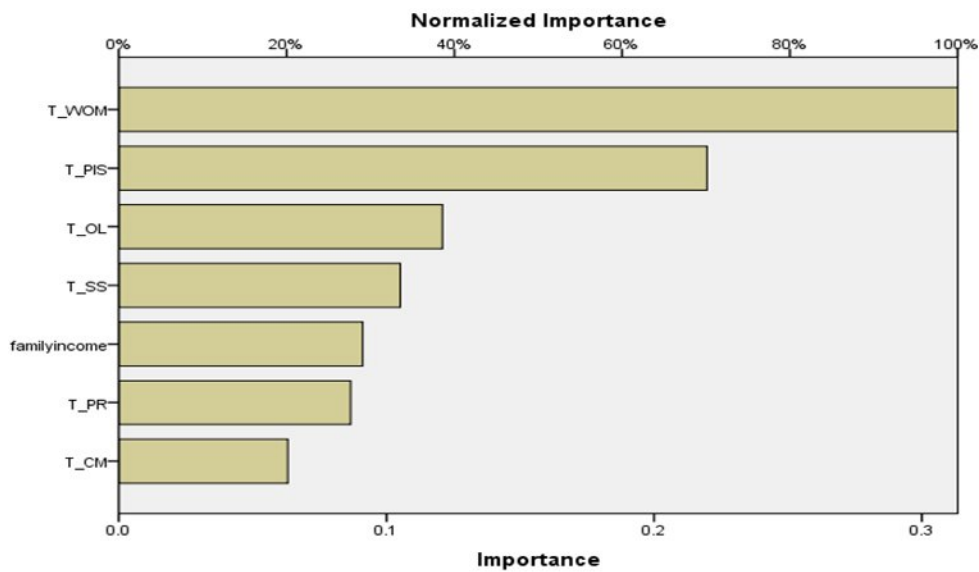
Fig. 4: Normalized Importance

Prediction Using MLP Model Manually:

Prediction of decision making of a respondents using MLP model, the values of the independent variable and weights estimated by the model are require. The weights for hidden and output layer are given in Table 1. As the model have three layers; input layer, hidden layer and output layer. So in first step hidden layer receives the weighted sum of incoming signals (information from independent variables) sent by input layer and process is in the hidden layer using Hyperbolic Tangent activation function

$f(x) = \dfrac{e^x - e^{-x}}{e^x + e^{-x}}$. The hidden layer turn sends an output signal towards the neuron in output layer. So processing on the weighted information received by the output layer is done on the same way as in hidden layer that is applying Softmax activation $\gamma(x_k) = \dfrac{e^{x_k}}{\sum\limits_{j} e^{x_j}}$. This function finally provides the probability for each category of dependent variable. The respondent will belong to that category of decision making for which this predicted probability is high. Detailed of this prediction processed is given the following, manual calculation for each layer is given below.

For illustration, let us consider the estimation of the first respondent's decision making. As stated above, for prediction the values of the independent variable are required. In the case of first respondents these values are given in the following table. The weights for prediction will be used from Table 2.

Independent Variable	Values of first respondents independent variable
T_ Family Income	4
T_Perceived Risk	19
T_Communication Medium	24
T_Word-of-Mouth	25
T_Social Structure	11
T_Opinion Leaders	15
T_Personal Information Source	20

Calculation for Input to Hidden Layer:

Let x_i denote the ith independent variable w_{ij} denotes the weight ith independent variable and the jth hidden layer node. Let y_j represent the jth node of hidden layer then in our case

$$y_j = bias + \sum_{i=1}^{n} w_{ij}x_i;$$

$$i = 1, 2, \ldots, n \quad and \quad j = 1, 2$$

Now we calculate the results at each node of hidden layers.

For first node

$$
\begin{aligned}
y_1 &= bias + \sum_{i=1}^{7} w_{i1}x_i \\
&= .174 + (4)(-.316) + (19)(.454) + (24)(-.353) + (25)(.108) + (11)(.293) \\
&\quad + (15)(.426) + (20)(.205) \\
&= .174 + (-1.264) + (8.626) + (-8.472) + (2.7) + (3.223) + (6.39) + (4.1) \\
&= 15.477
\end{aligned}
$$

For second node

$$y_2 = bias + \sum_{i=1}^{7} w_{i2}x_i$$
$$= -.865 + (4)(-.853) + (19)(.015) + (24)(-.405) + (25)(-.237) + (11)(.727)$$
$$+(15)(.548) + (20)(-.403)$$
$$= .865 + (-3.412) + (0.285) + (-9.72) + (-5.925) + (7.997) + (8.22) + (-8.06)$$
$$= -11.48$$

For third node

$$y_3 = bias + \sum_{i=1}^{7} w_{i3}x_i$$
$$= -.419 + (4)(-.148) + (19)(.151) + (24)(.302) + (25)(-.729) + (11)(.238)$$
$$+(15)(-.600) + (20)(-.089)$$
$$= -.419 + (-0.592) + (2.869) + (7.248) + (-18.225) + (2.618) + (-9)(-1.78)$$
$$= -17.281$$

For fourth node

$$y_4 = bias + \sum_{i=1}^{7} w_{i4}x_i$$
$$= -.233 + (4)(-.269) + (19)(-.073) + (24)(.381) + (25)(.410) + (11)(-.384)$$
$$+(15)(.370) + (20)(-.213)$$
$$= -.233 + (-1.076) + (-1.387) + (9.144) + (10.25) + (-4.224) + (5.55) + (-4.26)$$
$$= -13.764$$

For Fifth node

$$y_5 = bias + \sum_{i=1}^{7} w_{i5}x_i$$
$$= .651 + (4)(.430) + (19)(.577) + (24)(-.173) + (25)(-.099) + (11)(-.561)$$
$$+(15)(-.066) + (20)(-.487)$$
$$= .651 + (1.72) + (10.963) + (-4.152) + (-2.475) + (-6.171) + (-0.99) + (-9.74)$$
$$= -10.194$$

For sixth node

$$y_6 = bias + \sum_{i=1}^{7} w_{i6}x_i$$
$$= .232 + (4)(-.145) + (19)(.586) + (24)(-.351) + (25)(-.188) + (11)(-.085)$$
$$+(15)(1.074) + (20)(.067)$$
$$= .232 + (-0.58) + (11.134) + (-8.424) + (-4.7) + (0.935) + (16.11) + (1.34)$$
$$= 16.047$$

For seventh node

$$y_7 = bias + \sum_{i=1}^{7} w_{i7}x_i$$

$$= .309 + (4)(.126) + (19)(.302) + (24)(-.027) + (25)(.406) + (11)(.703)$$
$$+(15)(-.1084) + (20)(.344)$$
$$= .309 + (0.504) + (5.738) + (-0.648) + (10.15) + (7.733) + (-1.626) + (6.88)$$
$$= 29.04$$

Now we have to use the activation function tangent hyperbolic to obtain the result of each layer

For first node
$$\tanh(y_1) = \tanh(15.477) = 1$$

For second node
$$\tanh(y_2) = \tanh(-11.48) = -0.9999$$

For third node
$$\tanh(y_3) = \tanh(-17.281) = -1$$

For fourth node
$$\tanh(y_4) = \tanh(13.764) = 1$$

For fifth node
$$\tanh(y_5) = \tanh(-10.194) = -0.9999$$

For sixth node
$$\tanh(y_6) = \tanh(16.047) = 1$$

For seventh node
$$\tanh(y_7) = \tanh(29.04) = 1$$

Calculation for Hidden to Output Layer:

Let z_k denote the result for k^{th} node of output layer

$$z_k = bias + \sum_{j=1}^{2} w_{jk} \tanh(y_j)$$

For first output node

$$z_1 = bias + \sum_{j=1}^{2} w_{j1} \tanh(y_j)$$

$$= -.640 + (-.075)(1) + (.858)(-.09999) + (.146)(-1) + (-.511)(1)$$
$$+(.154)(-0.9999) + (-.337)(1) + (-.921)(1)$$
$$= -.640 - .075 - 0.8579142 - .146 - .511 - 0.1539846 - .337 - .921$$
$$= -3.6418142$$

For second output node

$$z_2 = bias + \sum_{j=1}^{2} w_{j2} \tanh(y_j)$$

$$= -.139 + (-.284)(1) + (-.203)(-.09999) + (-.992)(-1) + (.278)(1)$$
$$+ (-.726)(-0.9999) + (.629)(1) + (.836)(1)$$
$$= -.139 - .284 + 0.2029797 + .992 + .278 + 0.7259274 + .629 + .836$$
$$= 3.5189071$$

Calculation for Output Layer:

Finally, for calculating the prediction probabilities for each category of output variable (decision making) we use Softmax activation as $\gamma(z_k) = \dfrac{e^{z_k}}{\sum\limits_{j}^{k} e^{z_j}}$. According to this function

Predicted probability for first category (No)

$$\gamma(z_1) = \frac{e^{z_1}}{\sum\limits_{j}^{2} e^{z_j}} = \frac{-0.02620476}{33.77373039} = 0.000775891$$

Predicted probability for second category (Yes)

$$\gamma(z_2) = \frac{e^{z_2}}{\sum\limits_{j}^{2} e^{z_j}} = \frac{33.74752563}{33.77373039} = 0.999224108$$

As a result predicted probability for second category is high as compare to other categories it means; on the bases of considered independent variables first respondent is make their decision on the bases of considered factors regarding selection of a health care service

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UNCOVERING THE ROLE OF METAPHORS IN
STRATEGIC MANAGEMENT: A PARADIGM SHIFT

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ABSTRACT

This theoretical paper has focused on brain as a metaphor for studying the process of strategy formulation. The paper argues that when individuals within the organizations use brain to self-reflect the uncertainty in the environment, the organization are in better position to meet the competitive advantage.

INTRODUCTION

Ascribing to the social existence of the organizations (Stinchcombe, 2000; Weber, 1997) the human beings are the building blocks of organizations and in this view organizations are social entities (Broom, Casey, & Ritchey, 1997; Ringberg & Reihlen, 2008; Selznick, 1948). Whenever people come close to achieving certain goals they create organization. So, an organization refers to a person or group of people that are on purpose organized to achieve an overall, common goal or set of goals. Hence the organizations are social entities that work and sustain their operations in a social context (Broom et al., 1997; McAuley, Duberley, & Johnson, 2007). There are several significant features to consider about the goals of the business organization (Drazin, Glynn, & Kazanjian, 1999; Dutton, Dukerich, & Harquail, 1994). These characteristics are explicit or implicit. These characteristics are carefully considered and established, during the process of strategic planning (Daft & Wiginton, 1979; Downs, Durant, & Carr, 2003; Mehregan, Kahreh, & Yousefi). Members of the organization often have some image in their minds (Calvin, 1990) about, how the organization should be working, how it should appear when things are going well (Morgan, 1980, 1983). The explicit goals are quite clear and easy to understand by the organizational members while implicit goals of the organizations are quite complex (Martin, 2010).

As the societies are getting more and more industrialized the purpose of organizational creation and goals is also getting complex (Rappa, 2003). It is because of this importance and complexity of organizational existence a fully established paradigm under the domain of OMT exists to overview organizations in detail and in order to understand these goals, a stream of research in the domain of organizational theory is paying attention to metaphors or images of the organizations, so that members can clearly identify their role. According to (Daft & Wiginton, 1979; Drazin et al., 1999; Gioia, Schultz, & Corley, 2000) metaphors and role of language have gained great attention in the organizational studies. Organizational image or metaphors are seen in a broader perspective which includes the concepts that how organization is perceived by others,

(Dutton et al., 1994). Metaphors have gained great attention of academic interest as a tool for highlighting symbolic and ideational dimensions of organizational life (Morgan, 1983).

Organizations all over the world are spotted with confusions and obscurities, (Morgan, 1983) and in order to scan them internally and externally images of organizations play a meaningful role. Up till now most agreed upon classifications of metaphors encapsulates nine metaphors listed by Morgan (1983). These organizational metaphors include machines, organisms, culture, brain, political systems, psychic prisons, flux and transformation and instruments of domination. Metaphors are helpful because they transmits enormous amount of information, (Yousefi) thus presenting the receiver with ideas and situations that provides the opportunity to understand the organizations in a better way.

Organizations as machines acts as rational enterprise which are designed and prearranged to achieve predetermined goals as competently as possible, using the one best possible solution to systematize and linear concept of cause and effect (Galbraith, 1974; Morgan & Videotraining, 1997). Organizations as living organisms seek to adapt and survive in a changing environment. Organizations as brains are flexible, resilient and inventive (Calvin, 1994). Here, the capacity for intelligence and control is seen as being distributed throughout the enterprise, enabling the system as a whole to self-organize and evolve along with the emerging challenges (Takeuchi & Umemoto, 1996; Zeleny, 1977). Organizations as cultures act as mini-societies, with their own distinctive values, rituals, ideologies and beliefs (Scott, 1961). Organizations acts as an ongoing procedure of realism construction, which allows people to see and comprehend particular events, actions, objects, comments and situations in distinct ways (March, 1962). Organizations acts as systems of political activity in political system, with patterns of competing interests, conflict and power (Mintzberg, 1985). As psychic prisons organizations acts as systems that get trapped in their own thoughts and actions; and in which obsessions, mind traps, narcissism, strong emotions, illusions of control, anxieties and defense mechanisms become the focus of attention (Walsham, 1991). In flux and transformation, organizations acts as expressions of deeper processes of transformation and change (Taber, 2007). While acting as Instruments of Domination, organizations proceed as systems that exploit their employees, the natural environment and the global economy for their own ends; exposing the ethical and social dimensions as important points of focus (Morgan, 1980).

In today's world of uncertainty the success of an organization depends more than ever on the importance and usage of strategic planning and strategy formulation in achieving the ever desired business results (Godet, 2000; Godet & Roubelat, 1996). In other words, "If you don't know where you are going, any road will take you there " (David & Hall, 1998) implies the significance of the strategic planning.

All firms are competing with one another for gaining sustainable competitive edge over each other (Galbraith, 1973; Garud & Kotha, 1994). Sustainable competitive edge can only be gained by responding rapidly to the changes in environment and meeting the customer demands (Anderson & Rosenfeld, 1993; Arbib, 2005; Beer, 1972; Hedberg & jöhsson, 1977). This requires strategy formulation on regular basis and it can be done only if organization acts as a brain (Rumelt, 1998). Brain has the ability to self-organize and responds quickly to the broad range of external stimuli. Taking the lead from this line

of thought our argument is that the emergent school of strategy which also focuses on strategy formulation on emergent and regular basis (McDermott & O'Connor, 2002; Mintzberg & Waters, 1985) is directly linked to brain metaphor of the organizations as strategies will emerge according to the changes in environment and brain will act as a focal point for strategy formulation (Dyer, 1983).

It is of little doubt that all of these metaphors provide useful insights to the organizations, their makeup and their goals (Ashforth & Mael, 1989). Which metaphor is more useful to provide a deeper insight is coined to the scenario which needs attention and is at hand; hence to comment which metaphor is more effective is beyond the scope of this paper. The primary objective of this paper is to review process of strategy formulation with the help of grounded theory of images of the organizations. Taking the lead from Morgan's conceptualization of Metaphors or images this theoretical paper aims to use images of the organization as a framework for strategy formulation and in this back drop raises the following research questions.

1. How organizations are conceived?
2. What are the various images of the organizations?
3. How images of the organizations can be used to formulate the strategies?
4. What is the relevance of using brain as a metaphor for strategy formulation?

The next section will encapsulate the discussion on strategy formulation and relevance of a one metaphor brain in this process of strategy formulation.

LITERATURE REVIEW

Self-organization and the brain

The process of "Self-organization" is defined in terms of systems that are in general comprises of many parts that impulsively attain their structure or function without specific intrusion from an external agent (Dutton et al., 1994). Example of self-organization is provided by the growth of plants and animals. Another example is the creation of a sculpture by an artist (Haken, 2008).

The concept of self-organization was first discussed in ancient times in Greek philosophy (Paslack, 1991). Moreover, in more modern times, self-organization was discussed by the German philosopher Immanuel Kant (Paslack, 1991), who specifically dealt with the formation of the planetary system, as well as by the German philosopher Schelling (Paslack, 1991), whose discussion remains rather weak. In more modern times, self-organization was discussed by Heinz von Foerster (1992) within his book "Cybernetics of second order". A systematic study of self-organization phenomena is performed in the interdisciplinary field of synergetic (Haken, 2008) that is concerned with a profound mathematical basis of self-organization as well as with experimental studies of these phenomena.

The phenomenon of self-organization is found everywhere in living and non-living world. But at this point the research paper provides a predominantly interesting example, explicitly self-organization phenomena of the human brain. The human brain is one of the most composite systems that we all know in the world. It is composed of up to 100 billion neurons and glia cells which are strongly interconnected. For example, a single neuron can have more than 10,000 associations to the other neurons. The question to be asked is

who or what steers the various neurons so that they can generate macroscopic trend such as the logical navigation of muscles in locomotion, grasping, visualization that is in particular pattern identification and decision making (Drazin et al., 1999). An early proposal that the human brain acts as a self-organizing system according to the laws discovered by synergetic was presented by H. Haken in 1983. The explicit example of Gait transitions of horses were conceived as non-equilibrium phase transitions studied in synergetic that provide an explicit example of self-organizing phenomena. A similar suggestion was made in the context of dissipative structures by (Haag & Kaupenjohann, 2001; Kelso, Holt, Rubin, & Kugler, 1981; Kohonen, 1988).

Brain Metaphor

Most of the firms compete in industries that require quick responses to the changing environment and technology. Due to increase in customer demand new products are manufactured on continual basis. A human brain is capable of responding constantly to the changing environment. Brain can create new repertoires of behaviors and perception as it become accustomed to the change in environment (Garud & Kotha, 1994). Brain can learn new languages and its ability to self-organize makes it capable to respond quickly to wide range of external stimuli (Arbib, 2005). Due to these characteristics researchers are inspired to use brain as a metaphor in strategy formulation in order to respond the broad range of stimuli (Beer, 1972; Garud & Kotha, 1994).

Brain at Analogical Level

Most of the researchers suggest that the ability of brain to process information in parallel and dispersed is due to its layered structure that manner makes it to take action swiftly against the change in environment (Anderson & Rosenfeld, 1993; Arbib, 2005; Calvin, 1994). A group of similar type of neurons is fired through parallel processing which integrates the input and generates an output (see Figure 1). The generated output either excites or stops the activities of other neurons by means of synapses that create electrochemical connectivity among neurons (Anderson & Rosenfeld, 1993). Topographical is another feature of brain that promotes parallel processing and boost flexibility because it allows the transformation of complex information in parallel (Anderson & Rosenfeld, 1993; Arbib, 2005; Argyris, 1976; Beer, 1972; Calvin, 1990)

Schematic Representation of the Brain
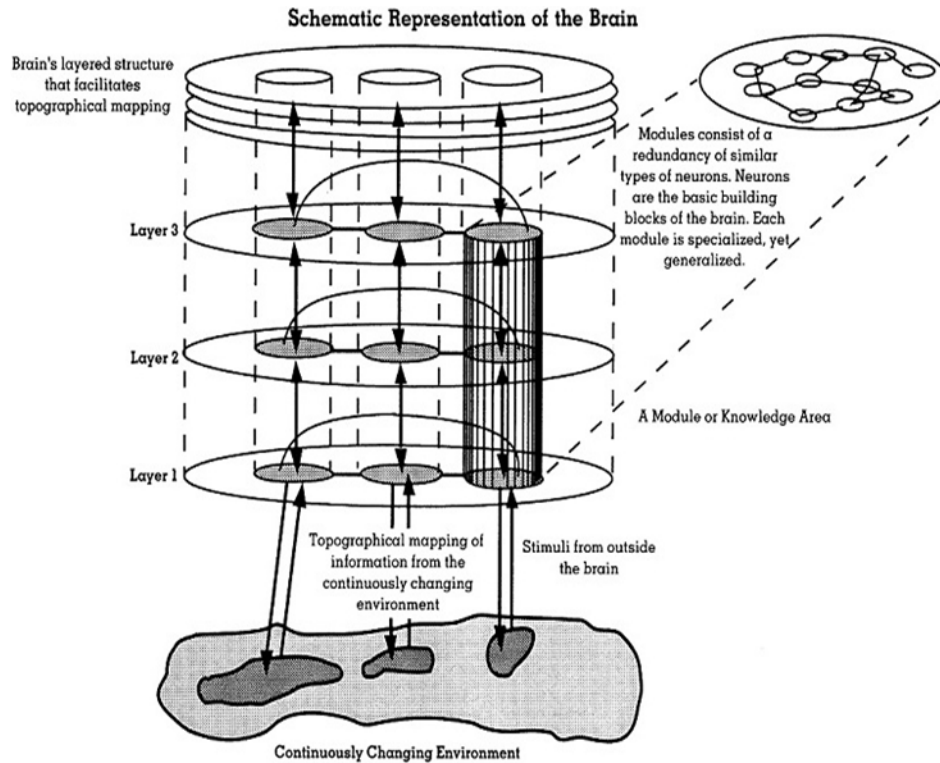
Source: Garud, R., & Kotha, S. (1994). Using the brain as a metaphor to model flexible
production systems. Academy of Management Review, 678.

Brain also performs several functions that are dispersed over other parts of brain's anatomy. In brain no prior estimation of operating parameters are made because it continuously changes with the environment. Brain tunes its operating parameters (Arbib, 2005) by updating its operating parameters that preside over the information transformation into insights and action.

Strategy Formulation

The art and science of formulating, implementing and evaluating strategy is broadly defined as strategic management (David & Hall, 1998). Although the scholars and practitioner believe that strategic management and resulting strategy is an important contributor to the firm performance. But till to date it is still debatable that in which form strategic management contributes to firm performance, in this line we claim that strategic management has not yet become a robust paradigm of studying organizational performance.

As the various schools has emerged over the time defining strategic management and resulting performance of the firm (e.g. Emergent school by Mintzberg and Planning school by Ansoof) hence the claim that strategic management has become a fully established paradigm is still debatable (Ansoff, 1987) and needs an extensive empirical

evidence. In the words of Kuhn a paradigm is unanimously recognized scientific achievements that, for a time period, provide problems and solutions for a community of researchers (Kuhn, 1996)". In this view if strategic management has become a fully established paradigm it must answer the relationship of strategic management with the performance in all contexts and types of the organization. With this notion the present study aims to examine the power of strategic management as a fully established paradigm of formulating strategy and resulting performance of the firm and further it will be interesting to discuss images of the organization as a tool for strategy formulation.

The strategy formulation is like coping with the beast and for the managers in today's word of uncertainty the beast is unmanageable until or unless they will use certain analytical tools that can proactively analyze the environmental uncertainty (Greenley, 1986, 1994; Mintzberg, 1990; Mintzberg, Ahlstrand, & Lampel, 2005). Thus strategic planning is a proactive approach that helps an organization to find a better position in an uncertain world (Amram & Kulatilaka, 1999; D. C. Eadie, 1983; D.C. Eadie, 2000) with the desired goal of reducing the implicit gap between current position of an organization and where it wants to be (Bryson, 1988, 2011; Gooderham, 1998).According to Eadie (2000) strategic planning is the centripetal force and is an organized process which helps to generate information about the environmental uncertainty and translates the organizational goals into practical objectives .Hence strategic planning helps to permeate the organizational culture and develops the intuition of managers about where we are now and where we want to go (Osborne, 1993). In Greenley's (1986, 1994) opinion there are two fundamental reason of strategic planning in the organizations first strategic planning improves the performance second it improves the organizational effectiveness.

Even when the immediate returns on application and use of strategic planning are not evident but in an uncertain environment, the usage of strategic management and strategic planning tools to remain competitive is not an option any more (Calantone, Garcia, & Dröge, 2003; Christensen, 1985; White, 1986). It is believed by the scholars that strategic management and usage of strategic planning for the strategy formulation is mandatory decision in front of mangers to cope with the serious challenges that organizations have been experiencing (Aldehayyat & Anchor, 2008; Paulraj & Chen, 2007). The organizations that use strategic planning as a compass to navigate through the turbulent environment develop a unique strategy and as a result gain competitive advantage (Wilson, 1998).

Various schools of thoughts on Strategy Formulation

The strategy literature is overwhelmed with various views of scholars and practitioners on effective formulation of strategy (Poister & Streib, 2005; Poister & Streib, 1999; Porter, 1996; Porter & Millar, 1985). But there are three schools that predominantly overshadow the strategy formulation process namely intuitive school and analytical or planning school and cognitive school (Mintzberg, 1990; Mintzberg et al., 2005; Mintzberg & Lampel, 1999; Nutt, 1984; Poister & Streib, 1999; Rindova & Kotha, 2001).

Intuitive School

The central of every decision is intuition (Mintzberg et al., 2005). Intuition is not an irrational phenomenon rather it is the deep understanding of a particular situation (Mckenna, 1999; Mintzherg, 1999). The chief role of manager in an organization is to

formulate strategies (Liedtka & Rosenblum, 1996). The future is dependent on the strategic process and is created through the strategic planning which comes from the intuition of managers (Gooderham, 1998; Simpson, 1998a, 1998b; Sjöberg, 2003). It is the intuition not the in depth analysis that leads to the strategy formulation (Simon, 1987; Zimmerman, 1990) in the organizations as intuition is quick, automatic and it allows the manager to know what is the best course of action (Mintzberg et al., 2005).

Analytical School

According to analytical schools an effective strategy is not the result of intuition only as it is the amalgamation of manager's insight towards backward and forward circumstances (Houlden, 1995). The analytical schools asserts that to look five years ahead, organization must look ten years backward so that effective trends can be analyzed and as a result effective strategies can be formulated (Desai, 2000; Schriefer, 1998). Here the underpinning logic is that relying on intuition is not enough organizations must analyze the uncertainty in the form of trends (Mintzberg et al., 2005). For analytical analysis of trends, organizations need tools and methodologies that can effectively analyze the environment (Amram & Kulatilaka, 1999). Hence the logic to successful planning is to get the best fit between the chosen tools and techniques, the organization's current culture, capabilities and business environment and the desired outcome (Gooderham, 1998).

Cognitive School

According to cognitive school, strategies are developed in people's mind as frames, models, concepts and schemas (Sørensen & Vidal, 2006). From 1980s till today research has grown steadily on cognitive biases in strategy making and on cognition as information processing, knowledge structure mapping and concept attainment (Mintzherg, 1999). All these play an important role in strategy formulation. The other branch of cognitive school has adopted a more subjective interpretative or constructivist view of the strategic process (Mintzberg et al., 2005). According to cognitive school, cognition is used to construct strategies (Haken, 2008) as creative interpretations rather than simply to map reality in some or more objective way.

Brain as a framework of strategy formulation

As discussed in the previous sections strategy formulation is a complex phenomenon and requires deep insights from the managers of the organizations. In this view it seems logical that brain can be used a framework for strategy formulation as when organizations are considered as brain they solely rely on their human resources to formulate strategies that can best meet the objectives of the organizations. Hence cognitions of the individuals will be reflected in the process of strategy formulation and brain will act a self reflective mechanism that will guide the future of the organizations.

DISCUSSION

The challenges which today mangers have to face in the organizations are trends such as globalization, technology advancement, deregulation, emerging of new markets and industries and economic restructuring have greatly increased the organization's need to develop its unique strategy (Aldehayyat & Anchor, 2008; Douglas & Craig, 1989; Kotabe & Murray, 2004).The historical discourse of OMT leads us to the time of Aristotle who for the first time used various metaphors for discussing the social phenomenon. Similar to

this line of thought today OMT has been accustomed to the usage of various metaphors to discuss the organizational phenomenon.

The strategy which is at the heart of organizational success is discussed in this paper through a metaphor of brain. We are of the view that if organizations have to survive in today's changing environment they have to use the cognition of individuals in their process of strategy formulation. According to cognitive school, people perceive and processes information regarding the changes in external environment. A strategy in cognitive school emerges as frames of realities using the self reflection of brain to cope uncertain environment. This cognitive school then requires individual's insights in to whole process. Hence brain which is the self-reflecting tool can be a guiding parameter for effective strategy formulation.

There is a need for organization's attention in this regard where extensive training and more empowerment to the individuals is required so that they can be used to employ brain while defining the process of strategy formulation. A useful guide in this connotation can be (Argyris, 1976) frame work of organizational learning where individuals through the process of single and double learning can be accustomed to use their brains so that past mistakes can be rendered and future strategies can be formulated in more effective manner.

CONCLUSION

Following set of conclusions can be drawn from this study. Organic organizations can be more successful and competitive if they can use brain as a framework for strategy formulation. Images of the organizations can be used to set forth the new dimensions of strategy formulation in the paradigm of strategic management. Self-reflection of the organizations can be more helpful to cope with the external environment as the organizations that are in touch with the uncertainty of environment and plan effectively through self reflection and can have a competitive advantage as they are in a position to develop an effective strategic plan aligned with the objectives of the organization.

LIMITATION

The paper is critically evaluating the usage of brain as metaphor for strategy formulation the research is limited to the extent that it has not critically evaluated other images of the organizations in the process of strategy formulation. The usage of brain as a metaphor in this paper is also limited with the extent that assumptions presented are not empirically tested.

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ABSTRACT

This review paper has encapsulated the scholarly work of Nick Bontis in the area of Intellectual Capital (IC). The paper has reviewed the literature on Intellectual capital and has captured the studies on IC in which Nick Bontis played a major role. The paper concludes by claiming Nick Bontis as the founder of IC in the field of Knowledge Management.

INTRODUCTION

Nick Bontis ascribing to the western thoughts of Positivism and empiricism have dilated on Intellectual capital in his seminal work "There is a price on your head managing intellectual capital strategically" and later reflected his thoughts in various articles and books. He sees knowledge at the heart of the organization and its products and aims to develop a framework of measuring tacit knowledge of individuals and organizations in a practical direction to enhance organizational "knowledge creation. For Bontis, what matters is the practice, the doing, the embodiment of knowledge. An organization can amplify and crystallize individual's tacit knowledge in a process that allows them to experience deeper understanding. His contribution in measuring intellectual capital describes the disciplined practices that can be used to measure tacit knowledge independent and available to restructure the organizational knowledge context.

In the late 1990's Bontis ascribed that the field of knowledge management (KM) has attained the attention of scholars over the last two decades because of it multidimensional and multi directional perspectives. To grasp the importance of KM as a significant contributor of firm performance Nonaka said that KM is the most important source of international competitiveness. In the same view Drucker heralds the arrival of a new economy referred to as the knowledge society. The new world order for the business is knowledge economy and in this knowledge economy knowledge is the primary resource of the organization and all the other resources i.e. Land, Labor, Capital and other factors of production are complementing this knowledge resource. From the capture, codification, and dissemination of information, through to the acquisition of new competencies via training and development, and on to the re-engineering of business processes, present and future success in knowledge economy will be based less on the strategic allocation of physical and financial resources and more on the strategic management of knowledge. The underpinning notion here is, knowledge is shared among the individuals of the organizations and is rooted into organization's history and

experiences. This logic supersedes all other organizational resources and it is quite evident that future economies will be knowledge led and role of the managers will be to manage the intellect of the organization by encapsulating the IC (IC) that will result into sustaining the advantage gained by this knowledge for the organization. Hence KM and its underlying paradigm of IC manage is at the crux of sustainable competitive advantage. It is because of this importance of the job title of chief knowledge officer (CKO) has been creeping up on annual reports and job advertisements with escalating frequency. These path finding knowledge officers have been given the fortunate task of channeling their organizations IC as an essential source of competitive advantage. Knowledge officers are accountable for justifying the worth of knowledge that is persistently being developed in their organizations. Despite of the fact that this hard to pin down intangible resource (IC) may never be evaluated in the financial terms that firms are currently adapted to it is of little doubt that its strategic impact is very high. IC research has primarily evolved from the desires of practitioners.

This burgeoning field of IC is an emerging area for both researchers and practitioners. IC is conceptualized from plentiful disciplines making the field a mosaic of perspectives. Accountants are concerned in how to measure it on the balance sheet, information technologists would like to codify it on systems, sociologists want to balance power with it, psychologists want to enlarge minds because of it, human resource managers want to compute an ROI on it, and training and development officers want to make sure that they can fabricate it. But the issue which still remains unaddressed is IC has been considered by many, defined by some, understood by a select few, and properly valued by practically no one. Future steps needed to remedy the situation.

Bontis quest for research can be traced in following questions:-

RQ1. What is the strategic Imperative of IC?
RQ2. How to operationalize IC into a measureable construct?

TIME LINE OF REVIEW

The review aims at exploring the background and critical events which shaped and influenced Bontis thought process in general and his research work as configured in the shape of articles and books commencing from a Business Quarterly Article, "There is a price on your head managing intellectual capital strategically" published in 1996, traversing though various articles leading to book 'The strategic management of intellectual capital and organizational knowledge' published in 2002. Later the paper synthesis the IC model to concept of three sub constructs HC, SC and CC elucidated in 1996 and then IC and Business Performance (200) ,IC of Nations (2004) and Moderating Role of HC on Employee capabilities (2007).

AN OVERVIEW OF BONTIS

Dr. Nick Bontis is the world's leading expert on IC and its impact on performance and is ranked among the top 30 management gurus world-wide. Nick Bontis is considered a leading academic researcher in the fields of IC and knowledge management. His ground-breaking doctoral dissertation became the number one downloaded thesis in

Canada. He has published over 66 articles in peer-reviewed journals, over 30 articles in peer-reviewed conference proceedings, and 12 teaching cases. His publications have won or have been nominated for over 12 research awards. Many of his papers are among the top cited articles in the history of their journals. He has amassed over 4,800 citations and an h-index of 24 placing him among world's most influential authors in the KM/IC field.

Nick has been immersed in the field since 1991 when a cover story in Fortune magazine, titled "Brainpower", changed the course of his life. Risking a secure future, Nick left a promising banking career to pursue a PhD in the field. His ground-breaking doctoral dissertation went on to become the #1 selling theses in Canada.

PHILOSOPHICAL ROOTS OF BONTIS WORK

The importance of knowledge can be discoursed back to the ancient Greeks; the first evidence of codification of knowledge may have its roots in scientific management coined by Frederick Taylor who attempted to formalize workers' experiences and tacit skills into objective rules and formulae. Taking this lead further Barnard extended scientific management by also coining 'behavioral knowledge' in management processes. As the two perspectives fused, a new blend of knowledge management was born that laid the foundation of organization theory. It was Simon who was influenced by the development of the computer and cognitive science that recognized the nature of decision making while performing administrative functions. Simon further recognized the limitations of human cognitive capacity and coined the term 'bounded rationality'. Whereas traditional inputs of capital are limited by physical space or monetary constraints, IC generation may be limited by the collective 'bounded rationality' of the organization. Further according to management guru Drucker in his description of post-capitalist society. Drucker highlights the significance and advent of a society that is dominated by knowledge resources and competitive landscape of IC allocation. These thought provoking developments in the field of organizational theory motivated the Bontis and he left a promising banking career to earn a PhD. Degree. These inspirations are helpful to us in identifying the philosophical underpinning of Bontis and we can propose that he has a positivist[1] mindset. In most of his work he used epistemology of empiricism and ontology of realism in the tradition of positivists.

DEVELOPMENT OF THOUGHTS

Bontis work is reflective of his experiences as a practitioner in banking sector and his interest in measuring the IC is further reflecting his keen interest in developing a framework for measuring tacit knowledge. This section will review the process of thought development in the work of Bontis the objective here is to conceptualize and frame the existing literature on IC contributed by Bontis and will cover these areas namely,

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[1] The epistemological and ontological roots of positivism can be defined as a hard methodology of finding the truth through observations can be traced back to Descartes who presented his philosophy of Cartesian dualism

1- IC (IC)
2- IC and Business performance
3- IC of Nations
4- Moderating role of IC on employee capabilities

Intellectual Capital (IC):
The term IC was first published by John Kenneth Galbraith in 1969 he believed that IC meant more than just "intellect as pure intellect" but rather incorporated a degree of "intellectual action". In this view, IC is not only a static intangible asset per se, but an ideological process; a means to an end. To take it further Stewart (1997) defines IC as "the intellectual material – knowledge, information, intellectual property, experience that can be put to use to create wealth." In fact Stewart's major contribution lies in the definition of IC and in the recognition of the difficulty to measure it. Organizational learning, as described by Chris Argyris (1992) has been considered of as the flow of knowledge in a firm; it follows then that IC is the stock of knowledge in the firm. To marry the two concepts, it may be useful to consider IC as the stock unit of organizational learning flows. However, IC cannot necessarily be taught through education and training. The most precious knowledge in an organization often cannot be passed on.

As reflected by Bontis the importance of IC cannot be denied but it has been rarely studied or understood. In fact, managers and investors woefully neglect intellectual inputs and outputs, though these far outweigh the assets that appear on balance sheets. The management of intellect of the organization lies at the heart of value in the current "knowledge era" of firms. Unfortunately, methods of measuring and evaluating IC have been slow to develop. There is an exceptionally inadequate literature on the study and management of IC. This is somewhat due to the fact of privacy that accompanies most firms and their debate on IC. Continued examination of this phenomenon shows that organizations with a high level of IC will be those in which the value-added service of the firm comes from deep professional knowledge, organizational learning, and protection and security of information. Managers, analysts and researchers should also be wary of looking for a metric formula of IC. By definition, the tacitness of IC may not allow analysts to ever measure it using economic variables. A warning must be sent out to those accountants and financial analysts who are asking the question, "How much is my IC worth?" A formula may never exist.

In order to measure IC and come up with a metric formula for measuring it is sub divided in to further sub constructs.

Hence IC is comprised of three subcontracts namely,
1- Human Capital (HC)
2- Structural Capital
3- Customer Capital or relational Capital (CC or RC)

Human Capital (HC):
The tacit knowledge embedded in the minds of the employees. Taking a lead from Bontis and to conceptualize HC, individuals in the organizations possess tacit knowledge (i.e. inarticulable skills and competencies to perform their tasks). The organizations are set of productive process and are influenced from the environment. Hence organizations receive tangible and informational inputs process these inputs into tangible informational

outputs through a series of flows. The major output for the organization in this flow is development of tacit knowledge into individuals following the whole process. Bontis reflected this development of tacit knowledge into individuals through a set of nodes that are linked and contributes to other nodes. There are multiple nodes in the organization each reflected as HC. HC is further defined as the combination of these four focal contours,

1- Genetic Inheritance
2- Education
3- Experience
4- Attitude towards life and business

According to Bontis HC is important as it is a source of innovation and strategic renewal, whether it is from brainstorming in any work settings i.e. research lab, daydreaming at the office, throwing out old files, re-engineering new processes, improving personal skills or developing new leads in a sales rep's little black book. The spirit of HC is the sheer intelligence of the organizational member. The compass of human capital is limited to the knowledge node (i.e. internal to the mind of the employee). It can be measured (although it is difficult) as a function of volume (i.e. a third degree measure encompassing size, location and time). It is also the hardest of the three sub-domains of intellectual capital to codify.

Structural Capital (SC):

It is defined as organizational routines of the business. According to Bontis the organization itself embodies tacit knowledge in its structure, which resides in: the myriads of relationships that facilitate the organization to work in a coordinated way but are reasonably understood by at most the participants in the relationship and a few others. This means that the organization is accomplishing its aims by following rules that are not known as such to most of the participants in the organization. This construct deals with the mechanisms and structures of the organization that can help support employees in their quest for optimum intellectual performance and therefore overall business performance. An individual can have a high level of intellect, but if the organization has poor systems and procedures by which to track his or her actions, the overall IC will not reach its fullest potential.

An organization with strong structural capital will have a supportive culture that allows individuals to try things, to fail, to learn, and to try again. If the culture unduly penalizes failure, its success will be minimal. Structuring intellectual assets with information systems can turn individual know-how into group property. It is the concept of structural capital that allows IC to be measured and developed in an organization. In effect, without structural capital, IC would just be human capital.

This construct therefore contains elements of efficiency, transaction times, procedural innovativeness and access to information for codification into knowledge. It also supports elements of cost minimization and profit maximization per employee. Structural capital is external to the organization and is the critical link that allows IC to be measured at an organizational level. In the node within the organization structural ties or links connect he human capital nodes with the structure of the organization and convert human capital into structural capital. Although difficulty in measuring still remains but structural capital can be measured as a function of efficiency.

Customer capital (CC):

The knowledge embedded in the relationships established with the outside environment. Knowledge of marketing channels and customer relationships is the main theme of customer capital. In the words of Bontis frustrated managers often do not recognize that they can tap into a wealth of knowledge from their own clients. After all, understanding what customers want in a product or a service better than anyone else is what lies at the heart to become the market leader than the follower.

Customer capital represents the potential an organization has due to ex-firm intangibles.

These intangibles include the knowledge embedded in customers, suppliers, the government or related industry associations. One manifestation of customer capital that can be leveraged from customers is often referred to as "market orientation". There is no consensus on a definition of market orientation, but two recent definitions coined by Kohli and Jaworski (1993) and Narver and Slater (1991) have become widely accepted. Both the streams of researchers are of the view that market orientation is putting the customer at the top and in order to satisfy the customer generating information from the market, disseminating that information throughout the organization and responding to the needs of customers is the crux of building relationship with the customers. Bontis reflected this process as customer capital or relational capital.

Within the knowledge nodes of the organization customer capital is external and is linked to the HC. Because of longevity of customer capital it is quite difficult to measure and codify.

The summary of above discussed literature is also presented in figure 1 below,
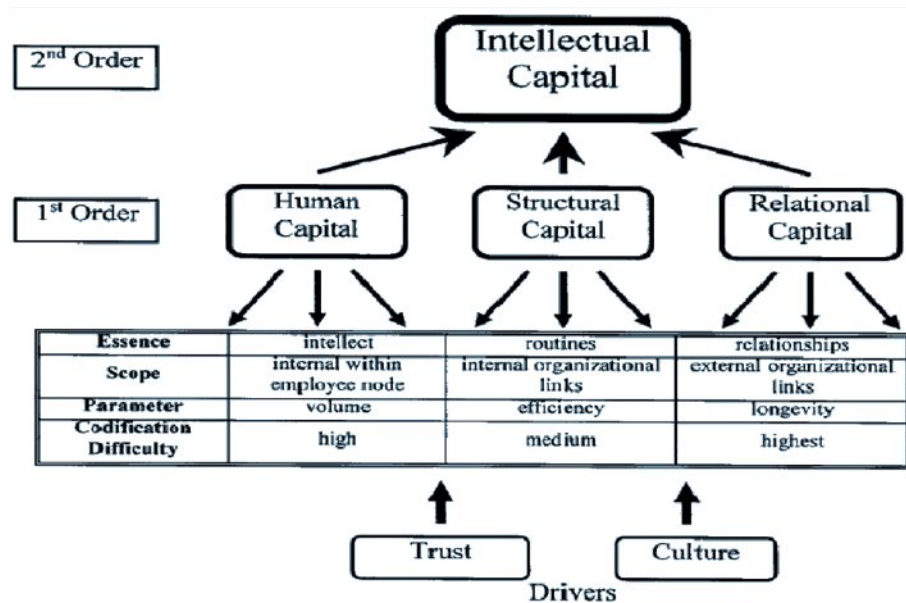
Fig. 1: Conceptualization of Intellectual Capital

Measuring IC:

By the end of the 1990s, references to IC in contemporary business publications were commonplace. But Bontis argued that until recently there has been little attempt to identify and give structure to the nature and role of intangible resources in the strategic management of a business. This is partly due to the fact that it is often very difficult for accountants and economists to allocate an orthodox valuation to intangibles as they rarely have an exchange value. In consequence, they usually lie outside the province of the commodity-based models of economics and accountancy

To grasp the importance of why it is necessary to measure IC, we must understand the concept of 'Tobin's q' from the accounting and finance literature. This ratio measures the relationship between a company's market value and its replacement value (i.e., the cost of replacing its assets).The ratio was developed by the Nobel Prizewinning economist James Tobin. In the long run, this ratio will tend toward 1.00, but evidence shows that it can differ significantly from 1.00 for very long periods of time.

For example, companies in the software industry, where IC is abundant tend to have a Tobin's q ratio of 7.00, whereas firms in the steel industry, noted for their large capital assets, have a Tobin's q ratio of nearly 1.00. From this it is of little doubt that IC adds value to the organization but the issue which needs to be resolved is how to measure it. In his seminal article in 1999 Bontis came up with a review of various toolboxes that organizations are using to measure intangible resources,

1- Human Resource Accounting (HRA)
2- Economic Value Added (EVA)
3- Balance Score Card (BSC)
4- Intellectual Capital (IC)

In fact the ground breaking contribution of Bontis is proposing the tool "INTELLECTUAL CAPITAL QUESTIONNAIRE" to measure IC. This tools has been validated and tested in various studies and is becoming a robust tool to measure the IC.

Intellectual Capital of Nations:

The IC of nations is the chronological development of thought in the scholarly work of Bontis. Taking a lead from the firm level Bontis extended this work of IC to measure the IC of nations. In order to measure IC of nation there is a requirement of the articulation of a system of variables that helps to uncover and manage the invisible wealth of a country. Although the importance of knowledge as a strategic asset can be traced back several thousands of years, it was the ancient Egyptian and Greek civilizations that represented the first evidence of the codification of knowledge for the purposes of leveraging regional power with their implementations of national libraries and universities. More recently Bontis is the first to coin the term "IC" and used it to emphasize the importance of general knowledge as essential to growth and development. Alfred Marshall says "knowledge is our most powerful engine of production; it enables us to subdue nature and . . . satisfy our wants". However, "knowledge is often costly to create, and that is why much of it is created industrial countries.

As reflected from the thoughts of Bontis theorists soon extrapolated the initial conceptual level to also include nations. He argues that leaders of national economies are

trying to find reliable ways for measuring knowledge assets to understand how they relate to future performance. The expectation from finding reliable measures of knowledge assets are that such measures can help governments better managing the intangible resources that increasingly determine the success of their economies. Key to determining these success factors are an understanding of relationships and synergistic modulations that can augment the value of each sub-component of IC. Approaching economic development from a knowledge perspective – that is, adopting policies to increase a nation's intellectual wealth can improve people's lives in myriad ways besides higher incomes.

The IC of a nation includes the hidden values of individuals, enterprises, institutions, communities and regions that are the current and potential sources for wealth creation. These hidden values are the roots for nourishment and the cultivation of future wellbeing. For this purpose, it is essential to have a mapping system to describe the IC of nations and systematically to account and follow the evolution of such IC development. The system used to capture the statistics and describe the constructs of national IC can be presented in the shape of a modified IC navigator for nations. This framework consists of five value-creating fields, each focusing on an individual sphere of interest. Market value is now national wealth, financial capital is now financial wealth, and customer capital is now market capital, innovation capital is now renewal capital. Hence extending the firm level IC to nation level IC it encapsulates the following dimensions,

Human Capital:
Human capital is defined as the knowledge, education and competencies of individuals in realizing national tasks and goals. The human capital of a nation begins with the intellectual wealth of its citizens.

Process capital:
Process capital is defined as the non-human storehouses of knowledge in a nation which are embedded in its technological, information and communications systems as represented by its hardware, software, databases, laboratories and organizational structures which sustain and externalize the output of human capital.

Market capital:
Market capital is defined as the IC embedded in national intra-relationships. Market capital represents a country's capabilities and successes in providing an attractive, competitive solution to the needs of its international clients, as compared with other countries. A country's investment and achievements in foreign relations, coupled with its exports of quality products and services, constitute a significant component in its development of market capital, which is rich in intangible assets.

Renewal capital:
Renewal capital is defined as a nation's future intellectual wealth. This includes its capabilities and actual investments in renewal and development for sustaining competitive advantage. Examination of the forces shaping renewal capital demonstrates the link between continued investment in renewal capital and sustained economic growth.

Further analysis of such components will yield a better understanding of existing challenges facing the nations.

Based on these dimensions Bontis operationalisation can be extended to measure IC of nations and can be a useful measure to promote the development of a particular country.

IC and Business performance:

The underpinning assumption in examining the relationship of IC with performance of business is to test and further validate the three sub constructs of IC i.e. HC, SC and CC and their interplay with the performance. Bontis initially examined this relationship in Canada by using his questionnaire of INTELLECTUAL CAPITAL QUESTIONNAIRE and found a positive relationship of IC with performance. He also came up with the findings that HC is strongly correlated with SC and CC. in order to generalize the findings and make the theory more robust the same model is further tested in various countries cf. Malaysia, Ireland, Israel etc.

Moderating Role of IC management Practices on Employee Capabilities:

More recently Bontis has examined the moderating role of IC management practices on various employees' capabilities e.g. motivating, job satisfaction, job performance. The purpose is twofold, first to highlight the importance of knowledge based practices with in the organizations and second to make IC a more robust paradigm of studying organizational performance.

Managerial Guide to Manage IC:

Bontis contribution in the field of KM cannot be denied and overlooked superficially. His major contribution resides in proposing the measureable tool for IC and also suggesting a guide to managers to effectively manage IC. In the following lines the suggestions are summarized,

1- Conduct an initial intellectual capital audit either by using a survey design through Likert-type scales in order to get an insight of the benchmark level of intellectual capital in existence.
2- Make knowledge management a requirement for evaluation purposes for each employee by assigning personal targets to intellectual capital development.
3- Formally define the role of knowledge in business and in particular industry find and secure the greatest resources of intellectual capital inside and outside the firm from places like industry associations, academia, customers, suppliers, and the government.
4- Recruit and hire a leader responsible for the intellectual capital development of your organization with a background in HR, Strategy and IT.
5- Classify organizational intellectual portfolio by producing a knowledge map of the organization and determine in which people and systems knowledge resides.
6- Utilize information systems and sharing tools that aid in knowledge exchange and codifying such as groupware technology, videoconferencing, Intranets, corporate universities and storytelling amongst employees.

7- Send employees to conferences and trade shows and have them spy. Do not pay for their travel expenses unless they share what they learned with the rest of the organization when they return.

8- Consistently conduct intellectual capital audits to re-evaluate the organization's knowledge accumulation use monetary values if at all possible, but do not be afraid to develop customized indices and metrics.

9- Identify gaps to be filled or holes to be plugged based on weaknesses relative to competitors, customers, suppliers and best practices.

10- Assemble the organization's new knowledge portfolio in an intellectual capital supplement to the annual report.

CONCLUDING REMARKS

Having seen the aforementioned aspects, it can be fairly concluded that the IC has been well-conceptualized drawing upon extensive review of the literature and significant data from the field in the form of empirical work. Bontis has orchestrated western thoughts in a practical manner which has yielded results. He has not drifted from his path having set the destination regarding IC as a framework of competitive advantage. Because of his seminal work and inclusion of theoretical and practical thoughts about knowledge, he is well respected around the globe.

In the wave of globalization there is an increasing emphasis on survival of the fittest in international competitiveness. In order to stay alive, organizations must win the international organizational learning race. The purpose of this review is to explore the ideas and development of thoughts of Nick Bontis a significant contributor of IC and its empirical measurement. The measures and models developed by him have been proven to be valid and reliable. In his view ideally, the shift of thinking in the future will be from shorter-term product focus strategies to longer-term human, structural and customer capital focus strategies.

Finally, all business leaders should be appreciative of the power knowledge management can have on business performance. The study of intellectual capital produces a tremendous amount of energy, energy that can take companies far beyond their current vision. It requires people to rethink their attitudes on intangible assets and to start recognizing the importance of measuring and strategically managing knowledge. Like human muscles, intellectual capital suffers from if organization will not use it.

ACHIEVING HIGH PERFORMANCE BY COMBINING TOTAL QUALITY MANAGEMENT AND KNOWLEDGE MANAGEMENT PHILOSOPHIES

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ABSTRACT

Organizational success depends on extraordinary organizational performance and providing value to the customers. Authors suggest that knowledge management and total quality management solely based on providing value to the customers and get enhanced performance of organizations in return. The purpose of this paper is that top management can achieve the performance excellence by TQM and Knowledge management philosophical perspectives. The study is based on literature review and the need for the development of a conceptual model is proposed in this paper. There is a need to maintain balance between and practicing the enablers of these two philosophies linking the KM for cost reduction and TQM for quality improvement lead to performance excellence. The model which is proposed in this paper can get better understanding that how knowledge management and TQM contribute better for performance excellence.

KEYWORDS

Knowledge Management, Total Quality Management and Performance Excellence

1. INTRODUCTION

In 1980's Total Quality Management was familiarized in firms for high performance but unfortunately it did not gain much acceptance and organizations were not concentrating on applying TQM practices. With the passage of time quality management for high performance converted this misconception into reality. According to (Lakhe & Mohanty, 1995) in order to maintain uniqueness, acquiring organizational aspirational performance and to select its desire place TQM is reflected the central component for the firms. In order to achieve the reasonable benefit and for the existence of the organizations, the function of TQM is critical determinant cited by the (Demirbag, Koh, Tatoglu, & Zaim, 2006).

Knowledge Management is comparatively a new emerging concept which can take advantage from highly recognized and internationally acknowledged TQM practices for high quality in order to get performance excellence. Kolarik, 1999 said that Total Quality Management enablers are customer focus, process oriented and organizational cultural change. Now organizations apply knowledge and skills of its employees for cost reduction, high quality and satisfaction of customer's needs (A.F. Kennedy, L. Schleife, 2007).

Ruhi (2003) exposed the countless benefits of knowledge sharing which comprises rise in customer's reaction, compulsion in making of traditional content and keeping well customer relationships.

An operative knowledge management change worker's actions towards approval and reliability of knowledge sharing among other personnel's. (Connely & Kelloway, 2003).

It is valued for the companies to reach the extended period practical competitive advantage with definite knowledge management (Lin, 2007; Ruhi, 2003; Wang, 2009).

2. LITERATURE REVIEW

Earlier there were many efforts have been done to classify the enablers of TQM (Saraph et al., 1989).It can be seen some balancing effect in previous work of these concepts where some enablers are accompaniment each other (Prajogo and Sohal, 2003). There are similarities between TQM and KM enablers and it is possible to apply the same enablers on both TQM and KM philosophies. Knowledge management processes, according to (Nonaka and Takeuchi, 1995) are Knowledge creation, Knowledge repossession, knowledge sharing and application. Earlier there were numerous struggles have been made for finding the   enablers of TQM .Hence there is no solid settlement of TQM philosophical perspective when its core enablers mentioned.

A complete exertion of TQM literature have shown that TQM enablers were steadily identify is seven ways, leadership, information, human resource management, customer focus, supplier management and process management (Sila 2007).According to (Teh, 2010) there are five variables of TQM are identified, being leadership, Training and Development, customer focus, Team work and corporate culture. As narrated by (Prajogo and Sohal, 2003) TQM determinants are leadership, customer focus, strategy and planning, information and analysis, process management and people management.

Previously there were many school of thoughts have been developed regarding knowledge management philosophy by Lee et al., 2001 and Nonaka, 1994.And in order to get better understanding regarding KM you have to focused on one school of thought. (Davali & Ansari, 2012) narrated that companies have to follow the rules and regulations provided by leadership and there is a requirement of top management support for getting knowledge for competitive advantage. So it can be seen that knowledge provide organizations an opportunity for remaining modest and it also helps organizations for cost reduction bu effective knowledge management. H. Ping Tserng, Yu-Cheng Lin, 2004 argued that knowledge management reduces the necessity to open knowledge orientation, cuts the interval and cost declining for resolving the difficulties and applying quality in decision making.

3. CONCEPTUAL MODEL AND PREPOSITION DEVELOPMENT

The Study is proposing that there is a need for the development of making a conceptual model where the definitive goal is to maintain the balance between Total Quality Management and Knowledge Management Philosophical perspectives for enhancing organizational performance.

3.1 Top management support in KM and TQM philosophies:

Top management guidance in companies refer to the concept where leader is to put influence their dependents to monitor their directions so that they can attain the anticipated goals and goals that has been immovable by the corporations. (Ranney, 1994)

MacNeil (2003) argued that Top management support in companies is based on sole factor where the employees are free to use their knowledge and know-how to relocation the valued knowledge to others via implicit knowledge sharing, mainly this atmosphere is shaped by management where there is a liberty in implicit and obvious knowledge sharing and this knowledge management can lead to contribution in difficult situational issues. Bryant, 2003 argued that frontrunners play a key role in operative knowledge management and through KM organizations can advance practical diffident benefit. Leadership always work in secondary role for applied inference of knowledge management trough knowledge gaining, knowledge distribution and knowledge allocation and these km processes is used for the energetic growth of mutual learning aptitude in companies (Elinger 1999).

On the basis of above literature, following preposition has been proposed.

> **PI:** *Top Management support in TQM and KM philosophies will have a positive impact on performance excellence.*

3.2 Customer centric in KM and TQM philosophies:

Sila 2007 suggests that the success of every company is totally built on gratification of its consumers and also reliant on customer's basic necessity satisfaction on steady origin for extended era. Therefor the anxieties of consumers centric and self-actualization of their basic needs and satisficing them will obtain the key consideration in the literature due to its major strength in increasing customer gratification in almost every kind of industry. (Hoang et al., 2006). Additionally customer's reply is always helpful to the quality improvement. Every company is concentrating on receiving customer's suggestions, their feedback and also public the information among their personnel. Philips (Royal Philips Electric) was focusing on storing the valuable knowledge about the customer's complaints and tries to resolve their issues by managing the valuable knowledge regarding problems identification and solution of their problems. Furthermore knowledge management methods that stressed on customer knowledge are degree and unit of knowledgeable resources that an organization can have (Bassi and Van Buren, 1999).

TQM and KM philosophies both are based on customer's satisfaction. On the basis of above literature following preposition has been developed.

> **P2:** *Customer centric thinking in TQM and KM philosophies will have a positive impact on performance excellence.*

3.3 Training and Growth in KM and TQM philosophies:

Training and growth has been recognized as an energetic activity to the submission of TQM (Snape, Wilkinson, Marchington, & Redman, 1995) and it is the growth of new knowledge and skills as a consequence of carried knowledge (Goetsch & Davis, 2000).

Goh (2002) suggested that applied workout and growth plays an important role and this applied work could sustenance to resolve difficulties together with absence of eagerness, worker's capability and permeable size. Therefor good and official training sessions will surely inspire the workers of any society to work in such a way that should be in the organizational knowledge sharing interest.

On the basis of above literature following preposition has been developed.

P3: *Training and Development as TQM and KM enabler will have a positive impact on quality improvement and cost reduction.*

3.4 Strong Adaptive Culture in KM and TQM Philosophies:

Strong adaptive culture is the emergence of organizational success. According to (Bose 2004) previous norms, politics, verbal rules, and social morals that influences on individual behavior are referred to as organizational culture. Organizational culture is known as one of the central matter that has an importance on knowledge management. (Lu, Tsang, & Peng, 2008). Culture could impact the performances of workers to transfer knowledge and developed a situation where there are thick shared ethics regarding the value of the readiness of employees knowledge sharing with others. (Cabrera & Cabrera, 2002).

TQM and KM both focuses on strong adaptive organizational culture. TQM talks about new elegances of leadership in companies, while KM presents a new method of observing at the information sharing and decision making by using that valuable information.

On the basis of above literature following preposition has been developed.

P4: *Strong adaptive organizational culture in TQM and KM philosophies will have a positive impact on performance excellence.*

4. PERFORMANCE EXCELLENCE PROPOSED MODEL

The proposed conceptual model has been developed to instantaneously examine the balanced relationship between TQM and KM philosophies and performance excellence. Hence the current study tries to link the gap by providing a root for a detailed awareness of the impact of balanced TQM and KM philosophies on performance excellence.
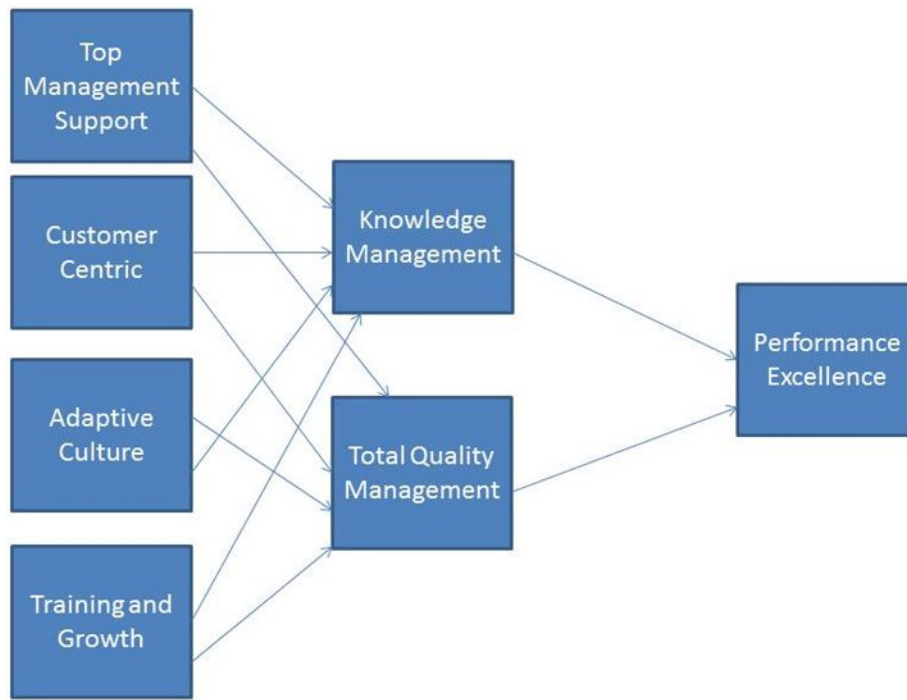
Fig. 1: KM and TQM Framework for Achieving Performance

5. CONCLUSIONS

Previously there have been many studies conducted to examine and KM and TQM impact on performance excellence. This study is focusing on making a conceptual model for checking the balancing effect of TQM and KM philosophies on performance excellence. The primary goal of this work is to target those organizations where these philosophies are used but not in shared form. The proposed model is suggesting that TQM and KM both working independently but they are strengthening one another. This research work takes initial step for balancing TQM and KM philosophies for performance excellence. And for the generalizability of this model there should be research and survey work in order to prove the prepositions.

6. PRACTICAL IMPLICATIONS

This Study is suggesting that for getting performance excellence leadership always plays an important role and the proposed model is helpful for higher management to properly used TQM and KM enablers and put their shared impact on performance excellence. Furthermore the knowledge workers can get better understanding.

7. FUTURE RESEARCH

Empirical study should be conducted in order to test the prepositions significantly. The proposed prepositions include both TQM and KM enablers like Leadership, Training and growth, customer centric and strong adaptive culture. Future researchers can work on these prepositions and the used enablers should be tested separately by developing the hypothesis. And there is a need to develop a conceptual model where the KM and TQM are harmonized or synchronized for performance excellence.

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ORGANIZATIONAL CYBERNETICS FOR CORPORATE GOVERNANCE ISSUES IN THE BUREAUCRATIC STRUCTURE ORGANIZATIONS: A CASE ON PAKISTAN RAILWAYS

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ABSTRACT

Purpose: The purpose of this paper is to study the corporate governance issues in bureaucratic organizations through organizational cybernetics approach. Bureaucratic structures have been adopted in the subcontinent since the British rule. These structures are outdated in this dynamic environment.

Design/methodology/approach: The concept of cybernetics that is the second order thinking is applied. Viable System Model approach has been used to diagnose the current bureaucratic structure of Pakistan Railways.

Findings: The bureaucratic structure prevailing in this dynamic environment has serious corporate governance issue like lack of coordination, loose control and monitoring, vague accountability; lack of segregation of duties, principal – agent problem, no future planning and political favoritism. Major steps like defining restructuring hierarchy, formal recruiting process, and team structure for projects should be taken to overcome these problems.

Practical Implications: The study might help the regulatory authorities and decision makers in addressing structural loopholes in the organization. This paper will help to take actions to make a bureaucratic structure viable according the external and internal environment.

Originality/value: This paper adds to the literature on using the organizational cybernetics approach for studying the organizational structure. The available literature does not provide the information regarding the corporate governance issues in the bureaucratic systems through cybernetics approach.

KEYWORDS

Cybernetics, Bureaucratic structure, Viable System Model, System Theory, Pakistan Railways, Corporate Governance Issues.

Paper Type: Research Paper

INTRODUCTION

Transportation industry in Pakistan is flourishing with the increase in population. With the population of 180.71 million (Economic Survey of Pakistan, 2011-12) the

communication demands in the overall country is rising. In the communication lies the transportation industry facilitating the population to travel from one place to another including air, land and by water transport as shown in figure 1. Transport industry is the supra system containing land, air and water transport its subsystems. The land transport further contains two major subsystems i.e. railways and road network.
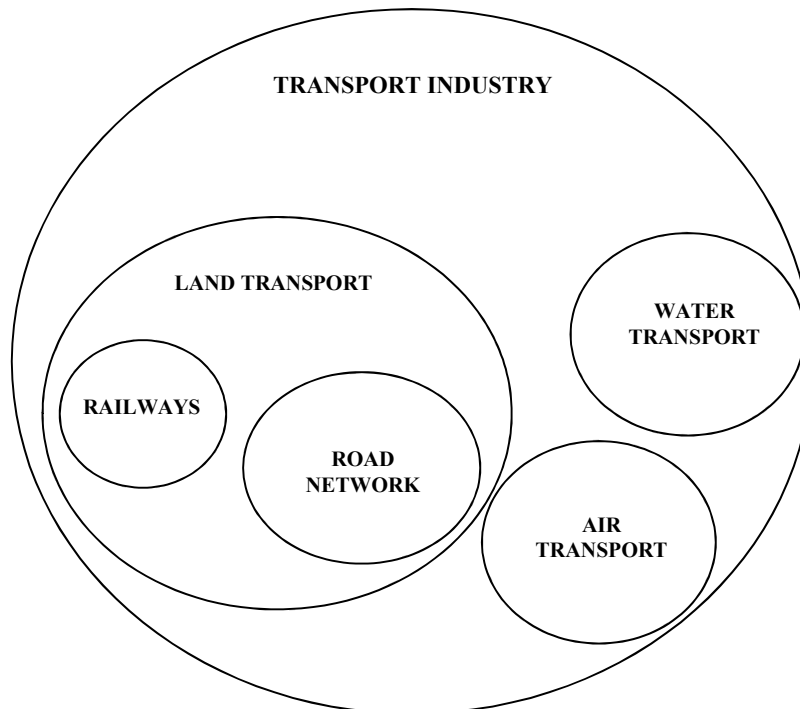
Figure 1

The expensive air transport is not utilized by bulk of the population as the Per-capita real income has a growth rate of just 2.33% (Economic Survey of Pakistan, 2011-12). The major portion of Pakistan is land than water, so water transport is limited. Thus the only cheap source of transportation available is the land transport. The two greatest groups i.e. road and railways are capturing most of the transportation system in Pakistan. Although the route covered in Kilometers of Pakistan Railways is 7791 (Pakistan Railway Year Book, 2010-11) but still it is not significant enough in the total land transport. The road network is spread in the whole country like the nervous system; exerting pressure on the market share of railways. The shrinking share of Pakistan Railways is further justified through the declining trend of the number of passengers carried by railways.
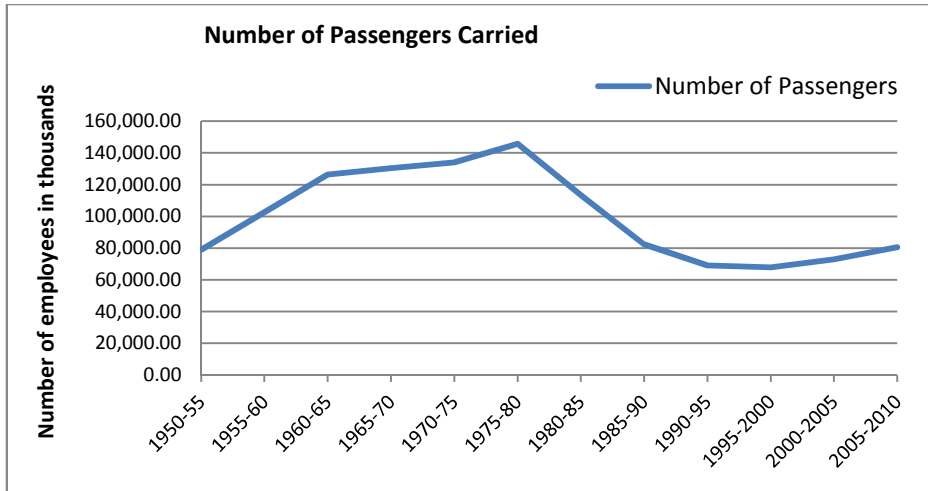
Fig. 2: (Pakistan Railway Year Book, 2010-11)

For success a company must accomplish two goals. First to satisfy its customers through identifying, creating and delivering products or services timely and second by selling its products in the rate that is covering their costs and the stakeholder's interest. (Holland, Feb 15, 2001). Unfortunately PR is not fulfilling both criteria, as its customers are declining and secondly it is unable to cover even its operating expenses.
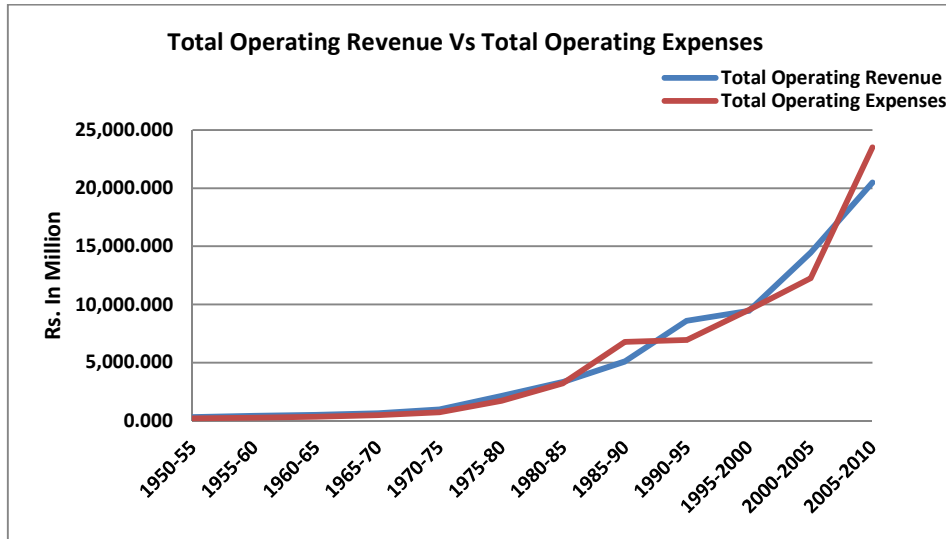
Fig. 3: (Pakistan Railway Year Book, 2010-11)

Thus the share of PR is declining in land transport. The shrinking share is not only because of external pressure by road network but also by internal weaknesses of PR. Technological advancement in road networks such as building of motorways and comfort

bus services such as Daewoo Pakistan has shifted the customers of Pakistan Railways from trains to buses/cars. Although the worldwide railways has flourished technologically, such as Poland is going to build an infrastructure inspection vehicle and a prototype electric locomotive (Progressive Pesa pushes into new markets, 2001). The neighboring country India, is building up high speed corridors from Delhi to Pune and then Ahmadabad that would facilitate the customers by covering 93 Kilometers distance in 4 hours (Jha, 2008). On contrary, PR is using old assets such as coal and diesel engines, broad gauge railway track and the manual signaling system.

LITERATURE REVIEW

There are several huge companies in the world that have suffered from the corporate governance issues resulting in the elimination from existence. Typical examples are found out from the cases of Enron (Kozzelmann and Deakin, 2003) and World Com, which collapsed and put corporate governance in to lime light. The need for the good corporate governance is required in the government owned organizations especially in the developing countries where major organizations are composed of bureaucratic structure.

Pakistan Railways has been taken in order to identify the weaknesses in the bureaucratic structure leading to issues related to corporate governance using the Viable System approach as well as considering the whole structure as a system and suggesting the possible outcomes/solutions for the restoration of the issues in the structure of Pakistan Railways that is able to be applied on every bureaucratic structure.

Previous studies related to bureaucratic structure and the corporate governance issues are found in many articles but articles regarding identifying the problem through cybernetics approach were missing to the best of my knowledge.

Bureaucracy is defined as an organizational framework marked by rules and procedures, hierarchy of authority, specialization and division of labor, separate positions and sitting, highly qualified personnel in there specialized tasks and written communications and records. (Daft, 2007).

One of the characteristics of bureaucratic organizations is hierarchy of authority and division of labor. As several critics have argued this that the division of labor may represent an effort by management to simplify the workers' task to the point where no skill is required to get the job done. This will remove the bargaining power of workforce with specialized skills and improves the bargaining power of management (Braveman, 1974)

Similarly bureaucratic hierarchies are not made for the efficient working of an organization but to present authority and status to some of its members at the expense of others (Edwards, 1979)

(Kenneth B, 1993)in his book, argued that bureaucratic organizations instead of well-organized and smooth working organizations, these are imbalanced organizations where top management is important and management at bottom is bent over, risks are avoided, responsibilities are evaded, customers and employees are treated impersonally like numbers, procedures become inflexible and permanent and customers does not feel well served and employees become mentally stressful.

One of the findings of the study revealed that the constraints to corporate governance in Nigeria were weak or non-existence law enforcement mechanisms, abuse of shareholder's right, lack of interests of directors, weak control systems, and lack of transparency and disclosure. (Okpara, 2011)

Agency relationship arises between two or more parties (Principal and Agent). The person designated as agent acts for, on behalf of, or as the representative for the other (Principal), in a particular domain of decision problems. Findings of the study revealed that the solution to the principal's problem implied that the fee-to-act mapping stimulate by the agent if completely known to the principal, then in such a case the principal can asked the agent to perform a particular act. But the problem arises in monitoring the act that the agent chooses. (Ross, May 1973)

(Moe, 1984)was of the view that the Once an Agent is Hired by the Principal there is no guarantee on part of the agent that he will in effect choose to pursue the principal's best interest or to do so efficiently. The agent in turn has its own interests at back and thus will pursue the principal's objective only to the extent that the incentive structure imposed in the contract renders such behavior advantageous. (Krause, 2003)

The Viable System Model

The viable system was described by a cybernetician Stafford Beer in his book "Brain of the Firm" in 1972. The system is more discussed in detail by (Espejo and Harnden, 1989), (Jackson, 2000), (Walker, 2001) and (Hoverstadt and Bowling, 2002)

The VSM model is developed on two fundamental concepts i.e. complexity and recursiveness. Variety is the measurement of complexity. According Ashby's Law of requisite variety, if a system is to stable then the number of states of its control mechanisms must be greater than or equal to the number of states in the system being controlled (Ashby, 1956). In organizational perspective there is a natural imbalance between the organization and its environment. The imbalance needs to be recognized and catered through certain strategies so that the organization can bring the organizational complexity with in its response range (Espejo and Gill, 2007)

All living systems are composed of subsystems which further contains subsystems and so on, right down to the level of single cell. Each system has self-organizing and self-regulatory characteristics. These systems at whatever hierarchy level are autonomous means that they contain with in the capacity to adapt according to the relevant complex external environment. Autonomy is defined as the "freedom of embedded system to act on its own initiative, but only within the framework of action determined by the purpose of total system" (Beer, Diagnosing the System for Organizations, 1985). According to the Recursive System Theorem, in a recursive organizational structure, every viable system contains and is contained in a viable system (Beer, The Heart of Enterprise, 1979) The recursive organizational structure is like a Russian doll that contains twins, triplets and even sextuplets at every level, this gives an idea that how complexity is simultaneously generated and resolved at each level through the process of unfolding (Espejo and Gill, 2007)

The cybernetic model of any viable system consists of five subsystems. System one (S1) i.e. implementation, consists of primary activities of an organization. This includes the operational part i.e. sub-units like people, departments, divisions or separate companies.

Second system (S2), co-ordination, involves conflict resolution authorities that also ensure the stability of system. As it is inevitable that there will be conflict of interest in the interactions that occur as parts of S1 interact.

As stability is ensure by S2, system three (S3), control, has the job to look in the ways to optimize these interactions. S3 works with principle of viewing the whole complex interacting S1. The thinking process is the part of S3 in order to ensure the synergy of the whole system.

System four (S4), Intelligence, ensures the survival of an organization in the changing environment. It analyses the outside world and produce plan for long term viability.

System five (S5), policy, provides the supreme authority ensuring that all the systems should function in same direction. It provides the policies and principles and ways of enforcing these policies and principles so that whole system is complete. It mainly focuses the communication channels of an organization with external environment and within organization. (Beer 1972, 1979, 1985).

Viable System Model	
System 1	Primary Activities
System 2	Coordination
System 3	Control
System 4	Decision Making
System 5	Policy Making/ Vision

DATA / METHODOLOGY/ APPROACH

Data has been taken from the yearly publications of Pakistan Railways i.e. Year Books. In order to study the current structure the organizational structure of year 2011 has been taken. Viable System Model is used as a diagnostic tool to study the conditions that generates and maintains the viability both within organization and external environment.

Organizational Structure of Pakistan Railways

Although Pakistan Railways have an obsolete infrastructure mostly inherited from British, but it is still capable of being profitable. Corporate governance issues are one of the major hindrances in the progress of this organization. These issues are embedded in the organizational structure of an organization. The organizational structure of PR is purely a bureaucratic structure.

(Annex 1 shows the organizational structure of Pakistan Railways)

VSM Applied: Problems in Bureaucratic Board Structure of Pakistan Railways

We will analyze the board structure of Pakistan Railways through the VSM model to investigate the constraints that are leading to good corporate governance in Pakistan Railways.

(Annex 2 shows the VSM applied on the organizational structure)

System 1	Primary Activities

Pakistan Railways is fully covering System 1, as it have a huge setup comprising of Finance, operations, police, Development, Planning and Marketing etc.

System 2	Coordination

The problem exists in system 2 of Pakistan Railways as there is lack of coordination among departments. It is one of the negative aspects of the bureaucratic structure; the communication flow is from top to bottom, not horizontal. As for example the Project Director Rehabilitation of Tracks is reporting to General Manager Operations who is reporting to Chairman and the other close link is Director Procurement which is under General Manager Maintenance reporting to Chairman. Thus both of them cannot coordinate directly on the project thus taking it more time for communication and energies for drafting feasibilities.

Secondly some of the designations are fitted wrongly in the structure as for example Director Operations is a separate system from General Manager Operations and same is the case with General Manager Development and Maintenance. As they all are catering the same need that is to improve the operations of Pakistan Railways.

System 3	Controlling

System 3 is the controlling body that is the Chairman of Railways. The major conflict is the lack of segregation of duties, as the controlling body is monitoring the whole systems as well as playing an active role in the communication of the departments. The dual responsibility of Chairman decreases efficiency and effectiveness of this designation.

On the other hand, each General Managers is controlling too much designations, this effects the controlling mechanism. It will not be possible for the manager to have an eye at each level. The loose controlling mechanism will give rise to corruption.

System 4	Decision Making

The system 4 that is the decision making body is the Railways Minister who should basically be passing orders to the Chairman, the controlling body. But the Chairman Railway is also the Secretary to Minister of Railways thus giving rise to the Principal Agent problem. Certainly if the person who is controlling is also the part of decision making body, then this may lead to misuse of powers as well as biased decision making. Moreover the same person will not be accountable to any one, this issue will leads towards corruption.

System 5	Vision/ Policy Making

The system 5 is the Government of Pakistan. The government has the responsibility to give Vision for Pakistan Railways but unfortunately it is operating without vision and future goals.

RECOMMENDATIONS

Corporate Governance issues has led Pakistan Railways to suffer from operating losses, unclear job descriptions and accounting parameters, Stagnant market share, no financial and administrative autonomy, corruption, low staff motivation, centralized decision making causing almost no coordination amongst staff members and lack of development in the railways structure.

The Government of Pakistan bears the responsibility to first of define a Vision for Pakistan Railways. It should include its development in next 20 years, profitability and a proper marketing plan which should correspond to the changing needs in accordance with the environment. This vision should be decided in the parliament meeting or in the executives meeting with the ministers of Pakistan so that a plate form is provided for the decision making authorities.

Secondly, Pakistan Railways should work on strategies to make changes in its hierarchy to uplift the institution of Pakistan railways. The proposed structure should be of Hybrid style with teams working for particular projects for example for doubling of tracks the finance, development and operations should make an assign team.

Next, General Manager Operations, Maintenance and Development should be working under Director Operations which will allow communication flow for rapidly and segregation of duties resulting in the ease of the duties of the chairman of railways allowing him to focus more on controlling of the organization. There should be formal recruiting system. The secretary railways should be a technocrat who has a well-defined knowledge of the railways as the Railways Minister is always a political person who might not have much knowledge about the technicalities.

CONCLUSION

Through the analysis of the board structure of the Pakistan Railways we come to a conclusion that the bureaucratic system leads towards inefficiencies resulting in mal practices. The formation of the structure should be a mixture of both vertical and horizontal in this dynamic environment. As previously the individual working was supportable for the organizations because the systems were less complex but now because of emergence of complex systems it has become obligatory for systems to interact with each other in order for the whole system to work together. In the case of Pakistan Railways it needs to make urgent changes in the board structure as well as to develop a vision so that it could show good performance in the coming years and to sustain pressures in the long run. This paper points out corporate governance problems in the overall structure, further studies may include devising the viable organizational structure, strategies, policies and system model at departmental level.

Organizational Chart (Pakistan Railways) 2010-2011
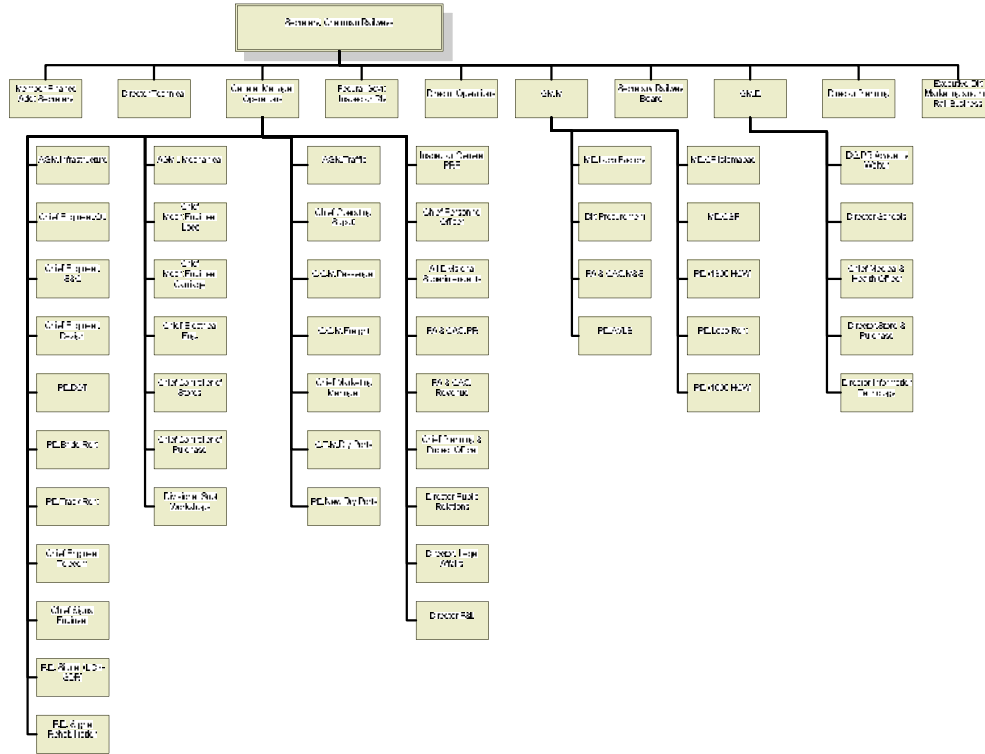
Source: (Pakistan Railway Year Book, 2010-11)

ANNEX 2:

Government of Pakistan		Stage 5 Vision

Ministry of Railways		Stage 4 Decision Making

Stage 1 Primary Activities

Secretary/ Chairman Railways		Stage 3 Controlling

Member Finance Addi.Secretary

Director Technical

General Manager Operations

Federal Govt. Inspector Rly.

Director Operations

GMM

Secretary Railway Board

GMD

Director Planning

Executive Dir: Marketing and non Rail Business

Stage 2 Coordination

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STRATEGIC GROUP MAPPING A STRONG INDICATOR IN MEASURING THE PERFORMANCE OF THE INDUSTRY: A CASE APPLIED ON THE EXPORT PERFORMANCE OF THE TEXTILE INDUSTRY IN PAKISTAN

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ABSTRACT

Strategic management tools are being applied on various organizations that help to design policy making and evaluating its overall performance, but for industry level there are hardly such related tools or in other words most of them are restricted to firm level only. For that purpose the importance of strategic group mapping as a strategic management tool has been illustrated through measuring the export performance of different Strategic groups in textile industry of Pakistan in terms of value addition. The findings suggests that the strategic group mapping is itself a strong performance measuring tool for the industry rather than using it for segmentation and then adopting another strategic management tool thus providing strong guidance for the policy making. This paper helps to identify the real problem that is the high quantity export of less valued textile products against high value added products in textiles leading to the deterioration in the export performance of the textile industry in Pakistan in light of strategic group mapping, thus providing a view for the policy makers to divert resources to specific segment of the industry. The available literature does not provide guidelines of strategic group mapping to draw focus of the policy makers on a particularized segment of the industry that leads to improve the performance of the overall industry, whereas this attempt suggests such possibility.

KEYWORDS

Strategic Management, Strategic group mapping, Pakistan textiles, export performance.

INTRODUCTION

The most important factor for an economy to flourish is its industry. As Industry influence the economy by lifting up the GDP through production/services, unemployment reduction, serves in the exports of the country as well as add opportunities for small businesses to operate within the country thus leading the economy towards recovery or boom. For that purpose, in any country the initial task for decision makers is to measure the performance of the industry which should reflect the real problems faced by the industry. But it is difficult to measure the performance of the industry and to determine the real problem if the industry is deteriorating especially when there are hardly any changes in the overall production as compared to previous but reduction in the revenues. The most commonly used tools in strategic management such as Balance score card,

Scandia Navigator, Porter's five forces, Ansoff matrix, BCG growth matrix are mostly feasible at firm level rather than applying them to the whole industry. On the other hand SWOT and PESTAL Analysis basically covers the environmental analysis of the industry rather than looking at the real problem within the industry.

Previously strategic group map, a strategic management tool, has been used as to divide the industry into groups (clusters) and then to apply the above mention tools in selected Strategic groups or to examine the mobility between Strategic groups of firms. Through this research it examines the real problems carried out in the textile industry of Pakistan leading to the deterioration of the export performance.

The section 1 of this paper covers the brief introduction of the textile sector of Pakistan, section 2 covers the supporting literature to the context, section 3 covers the Strategic Group Mapping Model of export performance of textile sector in Pakistan, Section 4 covers the roots behind the problem, Section 5 covers the Policy Guidelines and Section 6 is the conclusion.

Textile Sector of Pakistan
The three most essential needs for all humans have always been food, shelter and clothing. In the early stages of mankind the people used to cover up the third essential need by covering themselves through leaves. But as the population increased the need for fulfilling this basic need required the operation of large industry naming the textile industry. In Pakistan textile sector is considered to be the backbone of its economy as it is contributing 54% in total exports of Pakistan, accounts for 46% of total production and provides 38% of employment to manufacturing labor of the country.

Pakistan Textile industry is divided into two major categories i.e. organized and the unorganized mills. The organized mills are large scale firms operating in the country accomplishing all standards set to them by the countries law and other basic requirements. The unorganized mills have set their business on small scales with very few chances to expand and having very few opportunities to grasp the advance technology due to unavailability of funds as they are less capital intensive. In Pakistan unorganized mills are obviously covering a vast area and the importance of them cannot be ignored.

Textile has always been an important need for every country. Pakistan is in one of the fortunate countries where the whole textiles value chain exists which is as follows:

The value chain starts from the production of cotton. Pakistan is one of leading cotton production country. Next comes the ginning of the raw cotton which includes separating the lint from the seed of cotton. The man made fiber can also be called polyester that is prepared through different combinations of chemicals. In spinning the man made fiber or the cotton fibers coming from ginning and is converted to yarn.

From the spinning sub-sector there are two diversions. One is the making of cloth and from them the women garments and made ups are prepared and the other is from knitting to knit garments and made ups are made. Fortunately, in Pakistan all above sectors are spread in all parts of the country comprised both of organized and unorganized sectors.

Textiles in Pakistan has always played a significant role in the export sector of the country as is reflected through the previous year that more than half of the exports were of textiles commodity. But the problem that is arising is that the exports of Pakistan textiles has decline in terms of Monetary value from US $24827 in 2010-11 to US $16913 in 2011-12 which is showing signs of problem in the commodity wise major export industry of Pakistan. Whereas the total production has increased from 6736.130 M. Sq. Mtrs. in 2010-2011 to 6754.450 M. Sq. Mtrs. in 2011-2012 and the total cloth exports has also seen an increasing trend that is from 1294.893 M. Sq. Mtrs. in 2010-2011 to 1412.963 M. Sq. Mtrs. In 2011-2012 according to economic survey of Pakistan, showing that decline of exports in monetary value is not because of the decline in quantity. The major Pakistan textile export market for cotton and cotton cloth is in Asia (Bangladesh, India, Indonesia and Thailand) and for Readymade garments/Towels/Bed sheets are the American & European countries

LITERATURE REVIEW

According to Kaplan and Norton (1992) the balance scorecard is a management system that enables organizations to clarify ther vision and strategy and translate them into action. Edvinsson (1997)stated that skandia navigator is applicable to most organizations as a model for creating and extracting values for their knowledge. Grundy (2006)has been of the opinion that Porter's five forces model is a technique used for analyzing a company's

business environment and industrial context based on th 5 main aspects shaping a sector: competitors, new entrants, substitute products, customers and suppliers. The National Agency for innovation and reasearch (2008) illustrates BCG-Growth Matrix of the companies activities on a single diagram according to market share and market growth and helps to classify and evaluate the products and services of business.

Leask and Parker (2006) states that strategic group theory allows a detailed appraisal and comparison of company strategies with in an industry and the application of strategic group mapping is based on observations of hunt in 1972. According to Porter (1976, 1979) A strategic group is the group of firms in an industry following the similar strategy along the strategic dimension. Porter (1980) & Oster (1994) have an opinion that strategic groups can be viewed as a middle ground between industry and firms. Segars and Grover (1994) was of the opinion that strategic group mapping is helpful for researchers and makers to built dynamic pictures of industry positioning through its segmentation. Fiegenbaum and Thomas (1993) assess the mobility rates of firms between startegic groups by studying the longitudinal structure and strategic patterns of strategic groups in US insurance industry.

From the available literature it is obvious that the Balance Scorecard, Skandia Navigator, Porter's Five Forces and BCG-Growth Matrix are applicable at only firm level and strategic group map has not been used as the performance measurer of the industry.

Strategic Group Mapping

Value addition is an important factor in the decline of the exports in terms of monetary value as illustrated through the strategic group map, a tool for strategic management suggested by Michael Porter (1980), of various Strategic groups of textiles through its value addition in terms of per unit price on x-axis and quantity on y-axis from the data taken from the Economic Survey of Pakistan (2010):
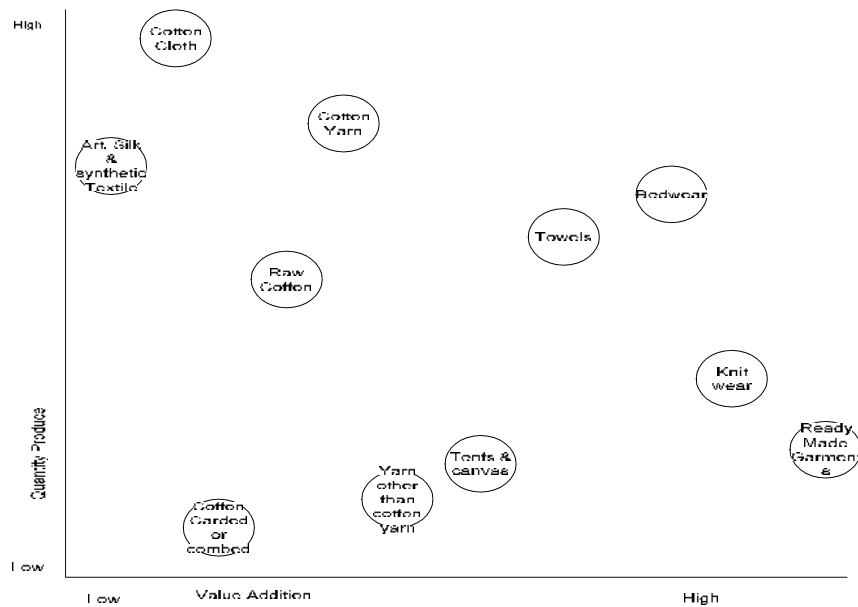
As is seen from the mapping above the major problem for the decline in exports for Pakistan Textiles in terms of revenue earning is the value addition that is Pakistan is exporting greater quantities of commodities in textiles which are low value added that are semi manufactured rather then finished textile products. The Quantity export of cotton cloth cotton yarn, Art, silk and Synthetic textiles is greater than the finished goods exported that are the towels, bed wear, Knit wear and ready-made garments.

ROOTS BEHIND THE PROBLEM IN THE EXPORT PERFORMANCE OF TEXTILE INDUSTRY:

Lack of Coordination and Mutual Cooperation
Between the textiles value added chain

As in the earlier context discussed the different sectors of the value added chain in Pakistan from cotton producing to finished goods produce are working to their potential but the problem is between the coordination of the sectors as to export more finish goods as compared to raw cotton it is essential for the final product of each sector to pass to the other sector rather than exported outside, which is reflected through the strategic group map.

Quality Inconsistency/Unchanged Designing

The finish textiles products are facing problems with the inconsistency in quality and unchanged design. As most of the finished textiles product segments lies in unorganized mill sectors because of which they are unable to grasp new and fast technology from the international market, also leading to rigid designing as could be seen from the table below that there is a continuous decline in the machinery exported:

Import of Textile Machinery						
				July-March		%
2004-05	2005-06	2006-07	2007-08	2007-08	2008-09	Change
928.6	817.240	502.89	438.27	318.1	171.5	-46.1
Source: Federal Bureau of Statistics						

Price Competition in High Value Added products

The textile sector has shifted towards production of high quality goods but on the same it still represents a significant size in low value added segments. The regional competitors are also shifting towards value added sector this has resulted the positioning of domestic low value-added spinning segment to improve. Moreover the gradual increase in the share of China, Bangladesh and India in the world textile and clothes exports ahs made the market more competitive (The Pakistan Credit Rating Agency Limited)

Less Availability of Skilled Labor and Child Labor Issues

Lack of skilled labor has become a serious issue for the textile industry. Due to this issue the assets employed by textile industry are not utilized effectively and efficiently. This results in low graded and less production, adversely affecting the exports. Moreover the emergence of child labor issue in Pakistan has decreased the cheap labor force and restriction on production.

Devaluation of Pakistani Currency Making Exports Cheaper:

Exchange Rate of Pak Rupee

	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Euro	55.21	65.35	72.28	75.36	72.14	79.17	92.17	107.43
Pound STG	87.75	94.27	106.42	113.18	106.43	117.18	125.30	126.09
USD	60.63	57.58	58.27	59.53	59.86	60.63	62.55	78.49
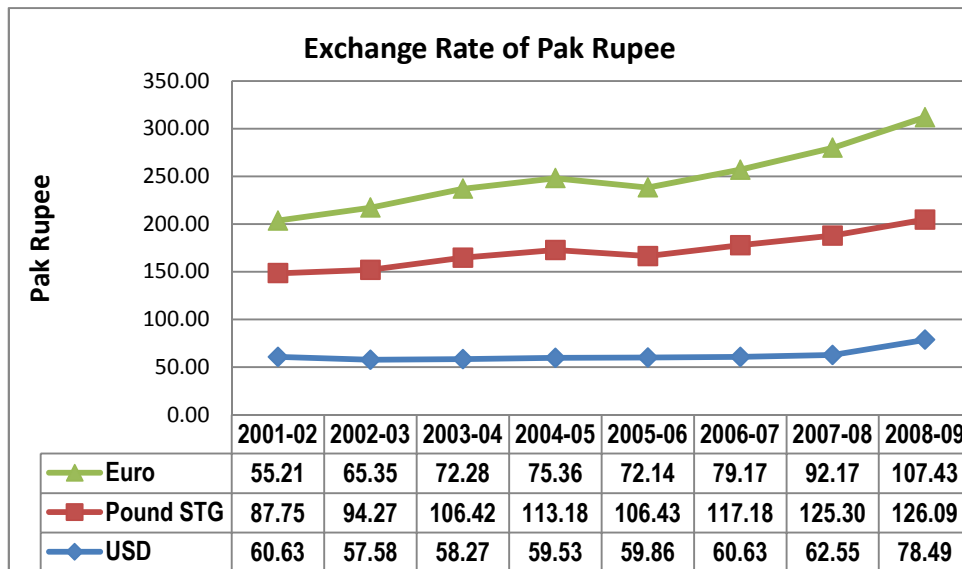
Source: State Bank of Pakistan

The devaluation of currency of Pakistan's currency over the years has decreased the value of exports. The exporter gets fewer amounts in return for increased production cost, hence affecting the overall export.

Policy Guidelines for Improving Textile Performance

The Policy that needs to develop should built on three phases that is to address the current needs to rectify the immediate issues, then to tackle with the short term issues and lastly with the long term issues. The immediate issue that needs to be tackled is the lack of coordination between the strategic groups (Segments of textiles). This could be tackle through developing a network of coordination between the associations which includes All Pakistan Textile Manufacturing Association, Pakistan Textile Export Association, Pakistan Cotton Ginners Association, Towel Manufacturing Association, All Pakistan Yarn Merchant Association, Pakistan Hosiery Manufacturers Association, Pakistan Readymade Garments Manufacturing & Exporters Association and All Pakistan Textiles Processing Mills Association.

Secondly for short term government should develop a policy framework with its implementation to gain control over the unorganized sector and to reduce social issues such as Child Labor, Conduct Training sessions, Maintain Quality through Controls and minimize the uneven growth of value chain.

For the Long run to Increase the international market Access government should move for Bilateral Trade Agreements at country Level and for developing brand imaging and positive textile imaging heavy advertisements and promotions should be carried out sponsored by both government and private producers.

CONCLUSION

Strategic Group map is a useful approach in measuring the performance of the industry as well as in identifying the loop holes among different components of the industry. It is obvious from this paper that low value added semi-manufactured export had caused the textile industry to not gain full benefits from the post quota regime.

For further studies textile policy framework should be develop in accordance with the policy guidelines to rectify the performance of the industry. The limitations were to access the commodity wise export data in terms of price as well as their respective quantities in previous year.

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CAUSES EFFECTS AND CONTROL MEASURES FOR EXCESS BILLING
BY LAHORE ELECTRICITY SUPPLY COMPANY

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ABSTRACT

The work presented in this article is on causes, effects and control measures for excess billing is mainly based on the primary data. The dependent variable taken into account was excess billing. The independent variables that affect the dependent variable were identified. The data was collected through questionnaires. The responses were computed and the data were analyzed statistically using the two most common software's Minitab and SPSS, The statistical techniques that were applied in order to analyze the data were the Linear Regression and Frequency Analysis. The results of statistical analysis were applied to accept/reject the hypotheses base on objectives of the project.. The nature of correlation between the two variables was checked and finally the results were interpreted and measures of control suggested accordingly.

KEYWORDS

Causes, Effects, Measures, Overbilling, LESCO, Lahore.

1. INTRODUCTION

Pakistan is trapped between rising demand and lagging supply of electricity. It has been in continued struggle to achieve and keep a balance between the supply and demand. Soon after the birth of the country, the control has been with centrally-managed public sector organization WAPDA that has failed to deliver the goods to solve this problem. The major cause of failure of WAPDA is shortage of production of electricity, yet there are many other significant causes that need attention: Line losses, theft of electricity, illegal connections and overbilling. Here, overbilling is the subject of study as it has worst hit, provinces particularly Khyber Pakhtoon Khawa, departments and organizations e.g. King Edward Medical College University, Lahore Model Town Society (Naseer, K, 2004), etc.

The major cause of failure of WAPDA to overcome electricity crises seems to be is its broad spectrum charter of heavy responsibilities such as generation, transmission and distribution of power, irrigation, water supply and drainage, prevention of water logging and reclamation of waterlogged and saline lands, flood management and inland navigation; theft, illegal connections, overbilling, etc. The overbilling to both private and public consumers of electricity that ultimately led to the provincial versus federal conflict was aggravated so much in the past decade WAPDA had to create a Special Cell to resolve overbill issues. The cell was created in 2005 with instructions to submit to federal

government a report known as Report on Reconciliation of Electricity Bills (ROR), to resolve federal vs. provincial conflict.

The Cell since its creation is trying to evolve a system to minimize the cases of excess billing to the possible extent and develop a strategy to recover excess bills from WAPDA. Some enquiries have been lodged to root out causes of excess billing and one of the reports identified the major causes as lack of interest and responsibility by government departments for reconciliation and payment of disputed bills (Hasan 1996), non-settlement of issues of excess billing, illegal connections delay in processing of bills in the office of Accountant General of WAPDA, late release of funds to the department and shortage of funds for clearance in the consumer department.

WAPDA justifies excess billing as a compensation for the extensive theft of electricity. In real terms, it has little justification for the large-scale power theft and illegal connections in the country. These power thefts are usually disguised under the name of excess billing.

Failure of WAPDA ultimately led to the resolution that an alternative management may be sought and that was the handing over the control to private entrepreneurship. Although overbilling has been the problem of almost every town in Pakistan, the industrialized towns like Faisalabad, Lahore, etc, in Punjab may be highlighted with this reference. Lahore being the most problematic due to being the hub of all illegalities such as theft, illegal connections and overbilling and its current control authority the Lahore Eclectic supply Company (LESCO) was scheduled for study.

The literature review indicated that overbilling was the problem only of Pakistan and many other countries are also involved in this problem and potential studies have been carried their experts. A few for reference may be India (Purkayasta, 1999), Pakistan (Naseer, K, 2005). Keeping in view the studies undertaken both at home and abroad, the goal of the study was overcoming of the problem of overbilling by LESCO in the City of Lahore while the main objectives were as under:

- To determine which variable affects the dependent variable i.e. Excess Billing and to what extent.
- To observe the correlation between different variable and independent variables and their respective consequences
- To incorporate the effects of excess billing on the entire consumer world as well as the main supplier in Lahore i.e. WAPDA
- To devise ways and methods to eradicate such problems, or to at least minimize them in the best manner possible for both the consumers and suppliers of electricity.

2. METHODOLOGY OF RESEARCH

2.1 Secondary Data

The sources of secondary data were articles from the internet (Websites), newspapers (Daily Times) and some previous researches related to the area of work presented here. Going through the articles on the internet and published reports of LESCO (LESCO Website) and its Finance Department related to excess billing of electricity helped in understanding the key issues pertaining to the energy sector in Pakistan as well as on the

international level and how independent variables would be responsible for the movements in the dependent variable.

2.2 Primary Data

The primary data were collected by recording the responses of consumers and interviewing them. Fieldwork included visits to different localities, government agencies, university cafeterias, fast food chains, etc. There were encountered all types of consumers in Lahore, which make it ideal for any kind of marketing research. The only major problem was getting housewives and women to fill the questionnaire that was the major instrument for gathering responses of consumers. The questionnaire was pre-audited and revised a number of times before final floating among the consumers. Apart from that interviews with high officials of LESCO, Finance Department and other stake government departments. The interview data were highly dependable, consistent and helpful in understanding the issue transparently.

Table 1: Description of questions/independent variables

Variables	Description
X_1	How Much are you charged above what you consume?/ Overcharged amount
X_2	How far your local is regulatory concerned with electricity issues?/Regulatory concern
X_3	Is corruption the reason for excess billing?/ Corruption
X_4	What is your expected bill?/Expected bills
$X_\%$	Does electricity disparity varies with locality of residence?/Locality of residence
X_5	Do you think excess billing is due to electricity theft?/Theft of electricity
X_6	Did electricity conditions came to a halt and corruption rose high in Musharraf's regime?/Past rule
X_7	Is excess billing a tool for LESCO to achieve its desired revenues?/Desired revenue
X_8	Is excess billing a tool for LESCO to compensate for electricity theft?/ Theft compensation
X_9	Are you charged in accordance of your units consumed? /Charge according to units consumed
X_{10}	Have you ever written an application against excess billing?/ Written complaints
X_{11}	Are you satisfied with the current performance of LESCO?/Satisfaction with LESCO performance

3. RESULTS AND DISCUSSION

3.1. Results of Frequency Analysis

Only the significant results of frequency analysis are displayed in Tables 2-11

Q1. How much you are charged above you consume?

Table 2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	500-1000	13	11.9	13.0	13.0
	1000	12	11.0	12.0	25.0
	1000-5000	47	43.1	47.0	72.0
	5000-10000	15	13.8	15.0	87.0
	10000 & Above	13	11.9	13.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

Table 2 indicates that only13 % of the individuals are charged between 500-100, followed by 12 % around 1000 and the highest overcharge was in the slate of Rs.1000-5000 meaning the most affected class was the middle class.

Q2. What are the reasons for excess billing?

Table 3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Corruption	67	61.5	67.0	67.0
	Failure of LESCO's Staff	21	19.3	21.0	88.0
	Pressure from the Top Personnel	12	11.0	12.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

According to Table 3, 67 % of consumers think that corruption is the main cause for excess billing. The least number of individuals i.e. 12% on average think that pressure from top personnel is the main cause

Q3. How Many times have your expectations regarding the bill have not been met?

Table 4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	57	52.3	57.0	57.0
	At times	27	24.8	27.0	84.0
	Not Sure	16	14.7	16.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

Table 4 says that majority (57 %) think that their expectations regarding their bills are never met indicating poor customer services by LESCO. Only 27% of the individuals say that these are met,

Q4. How far is your local regulatory authority concerned with issue of excess billing?

Table 5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Quite Close	55	50.5	55.0	55.0
	Not Much	44	40.4	44.0	99.0
	11.00	1	.9	1.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

Table 5 indicates that 55 % of consumers think that their local regulatory authority is concerned with the issue whereas 44% think that the authorities do not care as required by the consumers.

Q5. Is excess billing a flaw in LESCO's operational efficiency? Remedy, if any?

Table 6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	58	53.2	58.0	58.0
	No	25	22.9	25.0	83.0
	Not Sure	17	15.6	17.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

Table 6 shows that 58% of the individuals agree that there could be a solution for such problems whereas 25 % of the consumers on average thought that there is no solution for such issues.

Q6. Have you ever written an application against the issue of excess billing?

Table 7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	64	58.7	64.0	64.0
	No	26	23.9	26.0	90.0
	Not Bothered	10	9.2	10.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

Table 7 indicates that 64 % consumers stepped ahead and wrote application whereas 26% never wrote and followed; only 10 % of the consumers never bothered.

Q7. Are you satisfied with current performance of LESCO and the way they charge?

Table 8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	9	8.3	9.0	9.0
	No	74	67.9	74.0	83.0
	Not Sure	2	1.8	2.0	85.0
	Satisfied	7	6.4	7.0	92.0
	Not Satisfied	8	7.3	8.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

According to Table 5 only 9% of consumers are satisfied with current performance of LESCO whereas 74 % are not satisfied and remedies should be explored for such issues indicating delicacy of issue

Q8. Did electricity conditions came to a halt and corruption rose high in Musharraf's regime?

Table 9

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	85	78.0	85.0	85.0
	No	12	11.0	12.0	97.0
	Not Sure	3	2.8	3.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

Table 9 shows that that an alarming majority of consumers blame Musharraf's regime for the non –production of electric power that ultimately translated into current crises and aligned problems.

Q9. Is excess billing a result of electricity theft?

Table 10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	87	79.8	87.0	87.0
	No	13	11.9	13.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

According to Table 10, 87 % consumers think that excess billing is a result of theft of electricity whereas only 13 % disagreed to the statement.

Q10. Does the current worsening situation of electricity characterized by shortage of electricity and lower revenues lead LESCO to excess billing?

Table 11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	84	77.1	84.0	84.0
	Certainly Not	13	11.9	13.0	97.0
	Not Sure	2	1.8	2.0	99.0
	Others	1	.9	1.0	100.0
	Total	100	91.7	100.0	
Missing	System	9	8.3		
Total		109	100.0		

Table 11 shows that 84 % of the individuals agree to the statement that the current situation is worsening day by day whereas only a few think that this might not be the cause.

RESULTS OF MULTIPLE LINEAR REGRESSION ANALYSIS

The regression model equation was set as follows:

$$Y = \alpha + \beta_1 (X_1) + \beta_2 (X_2) + \beta_3 (X_3) + \beta_4 (X_4) \ldots..$$

where, Y is the dependent variable the excess bills charged from the consumers, 'α' is the constant which determines the value of the dependent variable when the independent variables are set at zero. The Beta one to Beta eleven in the equation is the slope coefficients which determine the effects of all the eight independent variables.

Table 12: Model Summary

Model	R	R Square	Adjusted R Square	Std. Err.of the Estimate
1	0.795	.662	.518	0.51

Table 13: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.214	8	1.527	1.214	.300(a)
	Residual	110.693	88	1.258		
	Total	122.907	96			

Table 14: Coefficients

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		β	Std. Error	Beta		
1	(Constant)	0.533	0.78		0.683	0.497
	X_1	-0.052	1.86	-0.29	-2.82	0.779
	X_2	0.55	1.21	0.46	0.456	0.65
	X_3	0.282	0.095	0.305	2.952	0.004
	X_4	-0.318	0.193	-0.181	-1.649	0.103
	X5	0.045	0.252	0.018	0.177	0.86
	X_6	0.027	0.197	0.015	0.136	0.892
	X_7	0.218	0.157	0.151	1.388	0.169
	X_8	0.08	0.147	0.06	0.547	0.586
	X_9	.-0.38	0.127	-0.03	-0.297	0.767
	X_{10}	0.205	0.166	0.126	1.232	0.221
	X_{11}	0.643	0.32	0.374	2.011	0.049

Thus after putting respective values, the linear equation takes the form:

$$X1 = 0.533 – 0.052*(Y1) – 0.55* (Y2) + 0.282* (Y3) -.318* (Y4) + .045* (Y5) + .027* (Y6) + .218*(Y7) + .080* (Y8) - .038 (Y9) + .205*(Y10)$$

The calculation leads to the values:
R Square= 0.795
Adjusted R^2 =0.662
Reference Significance Level= 0.00
Interpretation of Results & Analysis

The value of R i.e. 0.795 or 0.795*100=79.5% reflects a strong relation between the dependent variable in question i.e. Excess billing, and the indicated independent variables.

On the other hand, the adjusted R^2 explains variation in the dependent variable caused by the movements in the independent variable. An adjusted R^2 of 0.662 or 66.2 % indicates that 66.2 % of variation in the dependent variable is caused by the independent variables.

The overall significance level is also 0.300 which shows that the relationship of the dependent variable with the independent variables is extremely in a valid position, thus having a significant influence. Significance level should be less than 0.05 in order to satisfy the indicated hypothesis.

From the coefficient Table 14 different hypotheses were tested as under:

Hypothesis # 1

H_0: No significant relationship exists between corruption and excess billing in accordance with proper LESCO procedure.

H_1: Significant relational ship exists between corruption and excess billing in accordance with proper LESCO procedure.

Alternative hypothesis 1 is accepted and Null rejected.

Hypothesis # 2

H_0: No significant relationship exists between the locality of residence and the electricity charged in accordance with proper LESCO procedure.

H_1: Significant relationship exists between the locality of residence and the electricity charged in accordance with proper LESCO procedure.

Null hypothesis #2 is rejected according to our regression estimates.

Hypothesis # 3:

H_0: No significant relationship exists between electricity theft and the excess bills charged in accordance with proper LESCO procedure.

H_1: Significant relationship exists between electricity theft and the excess bills charged in accordance with proper LESCO procedure.

Alternative hypothesis is accepted.

CONCLUSIONS AND RECOMMENDATIONS

The authorities in Pakistan are formulating policies and implementing them to control the problem overbilling but either these policies are not effective enough or these are not being implemented properly to their full extent. The results of the paper would be useful to identify where the problem lies. This paper identifies the areas which are strongly related to excess of billing and need be focused upon. This paper will signal LESCO to follow appropriate tracks to improve its efficiency.

The problem in itself is not directly related with the supply and demand of electricity. The Government when questioned regarding huge heaps of excessive bills gets away by stating that the electricity shortage has resulted in such activities. Of course, we just cannot simply go ahead and blame supply and demand imbalance. The major reason for excessive billing is one of our most important independent variables i.e. corruption that has deformed Pakistan economy. It's neither the consumer, nor the suppliers, but it is rather the worst governance which is responsible for this deformation. The Government should step ahead, taking measures to reduce corruption, to increase supply of electricity, to hire personnel responsible for the verification of correct meter reading, and the bills imposed on the consumers. Pakistan can shift its production of electricity towards solid waste fuel based power plants to generate electricity. Even in the western world, the experts have declared it as reasonable alternative option. For Pakistan, even a reasonable fossil fuel can also be exploited safely. It is the Ther coal from which electricity more than our need can be produced. Unreasonably low pace of exploitation from this source is not understandable.

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AN ANALYSIS OF PRAGMATIC EFFECTS OF CARTOONS ON THE PSYCHE OF CHILDREN AND ITS EFFECT ON PARENTS HAVING DIFFERENT SOCIO-ECONOMIC BACKGROUND

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ABSTRACT

Cartoons are the great source of entertainment as well as learning for children. The research comprises an analysis of pragmatic effects of cartoons on the psyche of children and its effect on parents having different socio-economic backgrounds. A quantitative as well as qualitative research has been conducted to see the effect of cartoons on children. The sampling methodology used to conduct this research was cluster random sampling. Findings show that cartoons have a strong impact on the psyche of children and that they are responsible for a cultural change and shift in society. The research also reveals that proper use of language is very important in cartoons because children follow whatever is going on in a cartoon.

1. INTRODUCTION

This research study has observed the various changes in kid's programs, especially in cartoons. The researcher is of the view that some of the cartoons are adding up in the pre-existing knowledge to the students but most of today's cartoons are depicting fakeness of powers and also some wrong concepts to the children regarding super powers, super natural things, fantasy world where they can do whatever they want to. Because of these things children sometimes get influenced and they take flight of imagination. They have become more violent rather than having feelings of brotherhood. They also do demands for things which have cartoon characters printed on them. These demands also disturb parents having different socio-economic backgrounds. And also children who can not get those things become a victim of complex and discontentment. That's why the researcher wants to explore whether these problems are faced by majority or is it just a misconception of the researcher.

2. THEORETICAL ORIENTATION

Research title: The Adverse Effects of Cartoons on the Minds of our Children

By: Dr. Ruebert Saturnine III
Date: Thursday, April 1, 2004 at 12:00 am
Posted In | Magazines: AnimationWorld

This research study was a longitudinal research study. In it the researcher searched the adverse effects of cartoon named Walt Disney on a child (Dickie). According to his findings the child was highly influenced by these cartoons and he thought that if a little

mouse can drive a ship in river so he can also do the same job. Keeping this view in mind he once drove the ship during this suddenly his sister fell in water and he ruined her under the ship. After this incident his father filed a case against Walt Disney and Ub Iwerks on charges of corrupting a minor and inciting mischief. When Dickie took the stand in the summer of 1929, he told the jury, "I thought if a lowly, common mouse could drive a boat, surely I could too."

In other derogatory testimony, the boy's mother, Mrs. Virginia Johnson said, "After seeing that crazed mouse in the theater, Dickie became a hellion. He just wouldn't stop tormenting the cat. He even fashioned his father's ascots into a nest!" (the adverse effect of cartoons on our children).

According to another research carried out by The American Academy of Pediatrics (AAP) and the American Academy of Child and Adolescent Psychiatry (AACAP), "Children who view shows in which violence is very realistic, frequently repeated or unpunished, are more likely to imitate what they see." Hassan, father of two sons said, "There was a time when one of my sons began to play pranks on his little brother quite frequently, and I failed to understand the reason behind this sudden change in his behaviour, one day however I found him watching 'The Cramp Twins', and understood the reason for all this bullying." Hassan also said that he has become conscious of the cartoons that his sons watch since that time (Alia Bibi & Roshan Zehra: The News 2012).

3. METHODOLOGY

As the research is about children, cartoons and the effects of cartoons on children as well as on their parents so, the data was collected from parents who were the observers of their children. This research was both quantitative as well as qualitative because its' questionnaire included both open ended as well as close ended questions and the research was also based on pragmatic analysis of cartoons. So there were both qualitative as well as quantitative analyses carried out. The target population was the parents of those children who watch either Dora the Explorer or Ben 10. The researcher choose socio-economic aspect to make this research more valid according to class division of society for this purpose parents were selected from different socio-economic backgrounds. The target population included parents from lower, middle and upper class. The data was collected from total 100 parents of 100 children (between the ages of 3-13) of Lahore Pakistan. The division of selection was based on socio-economic background i.e. 35 parents from upper class, 33 from middle class and 32 from lower class. The sum of all of them made the population 100. Parents were selected from different areas of Lahore by choosing Stratified random sampling technique. The data was collected through an informal interview from those children who watch cartoons more frequently as well as from those who buy stuff having the pictures of their favorite cartoons and through questionnaires from parents who buy things which their children demand and from those who observe the effects of cartoons on the behaviour of their children. Data for qualitative analysis was collected from CDs or DVDs of cartoons available in market. The quantitative data will be analyzed by using the statistical software SPSS. Inclusion criterion included 35 parents from different areas of Lahore having upper class background, 33 parents from different areas of Lahore having middle class background, 32 parents from different areas of Lahore having lower class background, CD of Dora the

Explorer "Dora's big birthday adventure" and CD of Ben 10 "Ben 10 Ultimate Alien". Exclusion criteria included rest of the parents having any kind of socio-economic background, rest of the Dora the Explorer CDs available in market and rest of the Ben 10 CDs available in market.

4. DISCUSSION

Parents who had participated in filling the questionnaire their children were from age 3-13. The questionnaires were given to different types of families, belonging to all socio-economic back grounds. It was good experience to interact with people and getting there views was the great deal for researcher. Well the results of questionnaire were tremendous. The responses of respondents show that they observe their children intensely. All of them said that their children watch cartoons and more than half of the population is agreed at the fact that cartoons have great influence in the lives of children.

When the researcher asked parents about the attitude of children, 83% of them were agree that their children are highly influenced by the cartoons. Previous researches also show the same results as this research is depicting.

In literature review the researcher had seen the incident where children get attracted towards things having cartoons images printed on. So same case is here 95% parents were agreed on the point that children do demands of things that are related to cartoons. Some of the parents were of the view that sometimes children become so stubborn for getting things related to cartoons. Mostly under the age of ten they make more demands of having thing related to cartoons. The things which most of the parents mentioned commonly are puzzles, bags, stuff toys, t. shirts, geometry boxes, stickers, cakes, hair pins, bed spreads, shoes, clothes like Dora, Ben 10 watch, bat, tattoos, pencils, lunch boxes, water bottle, cartoons CDs of both characters, mugs, fighting games and cards.

So many parents were of the view that sellers make it a business. They intentionally put things related to cartoons in front of the show cases. So whenever children come across these things they start demanding them. Researcher asked the parents whether they get their children all things which they demand or sometimes they get them the things. The response was the other way round what the researcher was thinking. Most of the people belonging to upper class said no to the question. They said always fulfilling the needs and wants make children more stubborn and sometimes it becomes the cause of destruction for them. Children get spoiled due to fulfilling demands. Most of the people belonging to middle class said that they get their children things because they don't want their children to become a victim of complex among other fellows. Parents belonging to lower class said yes to the question they said that often they get things to their children because they feel afraid of getting their children involved in the habit of committing crimes e.g. stealing, pocket picking, snatching etc. when the researcher asked about financial plans people belonging to elite class said no to this question because most of them said that they don't get things to their children and at the same time they are economically strong, so this question was basically not meant for them, it was for middle and lower class. Results show that as things are expensive than ordinary things. 70% population is agreed on this point. In past when the researcher was making research proposal in that there was an article related to this which mentioned that in America and

London it has become a consumer culture. That means people really have made these things to pursue their businesses. They have also mentioned the fact that teenagers also take interest in having things related to cartoons. Most of the results were alike. When the question comes at financial plan it was surprising to see that same percentages came out in the form of result as they were selected to have sample size. 35% people said that there no effect of it on the financial plans of them. 33% people respond that they often face financial problems due to the demands of their children. Researcher mentioned a question to pick any three changes which they felt that their child is going trough after watching these cartoons.

The results proved that cartoons are actually affecting the psyche of children. The reason of such demands is lack of counseling of parents. Cartoons like Ben 10 are for adults not for children. And these cartoons are depicting other cultures. After this question the researcher steps towards the questions with range. The first question was, are children showing violent behaviour after watching Ben 10? In the answer of this question 51% people said strongly agree that shows the change in attitude and also change in thinking of children. Due to violence on screen they start making their minds violent. That is not good. As one parent said my son stated beating brothers and sisters. It means what they see they practice the same. So basically it is not the fault of children the fault is within parents counseling. They should tell children about the distinction of right and wrong, good and evil so that children might try to protect themselves as well as others.

Similarly on the other hand another example of cartoon is Dora the explorer is quite informative and learning based cartoon. Children especially girls learn a lot from it. It also captivates children but totally the other way round than Ben 10. It makes children to learn more about things, e.g. names of things in bag pack, forest names, lakes names etc. Dora speaks name of things thrice which creates an atmosphere of learning. Parents said their children start using good vocabulary because of these cartoons. Ben 10 captivated children especially boys they start believing in super powers and want to get things done by clicking their watches. One more aspect which researcher feels during qualitative analysis of Ben 10 is the culture which they are showing. Girls are roaming around with their boyfriends. There were three girls shown as girlfriends of Ben 10. This makes a lot of differences in our set up of society. Same as Dora she always give hugs everybody which is not acceptable in some cultures. People cannot hug each other all the time. Otherwise, later on these things will change into complexities. Likewise making magic wishes from wizzle is not a part of some cultures. In next question of behaviour again people gave the same answers that yes children do act like them because children are an innocent creature and they adopt things easily. Whereas the matter of imagination is concerned, it is good that children imagine different things; it makes their cognition strong and productive. They start making plans by imagining different things in different manner. That will lead them to gain more self-confidence as well as they can produce problem solving techniques by their own selves.

When the researcher asked the question about getting far from culture 56% responses of people lies under the headings of strongly agree and agree. That means people are observing changes in the society and culture because of these cartoons. Children are no more interested in having tags of brothers and sisters; they more likely get in to and enjoy the relationships of friends, girlfriends and boyfriends. Mostly upper class's response lies

under the heading of disagree at this question because they don't feel such discriminations within the premises of their families and society. When parents were ask about the activities of their children and about giving time to their studies they gave varied answers. 64% people said that their children spend most of their time in front of TV and pay less attention to their studies. Some parents said that they are so rigid in study matter so they never let their children to watch television at study time.

Moreover the analysis of cartoons show that the language which is being spoken somewhere flout or disobey the maxims of manner, relevance, quality and quantity at the same time the spoken discourse is quite clear and understandable for children. The vocabulary which is being used is quite informative and gives a lot of new words to learn to the children. The overall analysis shows that the language should slightly be improved.

This research gives relevant results to the hypothesis given by the researcher, this research is also a connection and it is an addition to the past researches as it relates to these researches from every aspect. Data is quite relevant according to the results of the researches of literature review. Those researches also have told and proved that there is a strong impact of cartoons in the life of children.

5. SUGGESTIONS

- Parents should make their kids realize that these fantasy things have no true value and identity, there is no such 'Ben 10' wrist watch which will start blinking and will alert Ben of every evil action before hand.
- Parents need to keep an eye on their children's activities and should be observant of any peculiar changes in their behaviour. They should tell their children that if someone is killed or beaten up by cartoons it does not mean that kids should also start doing the same.
- With intervals they should have an interrogation session with them and try to clear the reality of things and should answer the controversial and ambiguous questions they have in their mind.
- Thus, for making cartoons a healthy entertainment and a good and effective source of learning for children parents should pay a little heed towards providing selective cartoons to their children which could have a positive impact on them.
- Television authority should tell in caption that which cartoon is for which age group.
- They should also tell as footer highlights that these things have no connection with real world.
- Manufacturing authorities/ industries should not make it a business.
- They should not play with the emotions of children, because if parents are unable to afford to buy that thing so it will make trouble for them. And children will come under the pressure of complex and they might steal those things.
- Hence, schools or other organizations should give such things as price of some act.
- They can make goody bags of small things and give them to children on some special occasions.

6. COMMENTS AND CONCLUSION

It is concluded under the shadow of analysis that cartoons have strong effects on the psyche of children. Findings have proved that children get influenced by things having cartoon pictures on them. It also disturbs the financial plans of parents because of the expensiveness. Children believing in super powers do make power grouping among them and try to tease their brothers and sisters. Results show that the language use and gestures of cartoons have a strong impact on our cultural aspects. Findings have also proved that children learn a lot form cartoons especially from Dora the Explorer. The overall research project reflects that the null hypothesis is being accepted and objectives of this research study have met to their ends.

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FOLLOWERSHIP IS LEADERSHIP

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ABSTRACT

This paper is about to explore the most neglected side of leadership phenomenon, the followers. Through the help of literature and universally accepted traits of leadership a conceptual model of followership is leadership has been proposed. This model explains that exemplary followers act as leader in certain circumstances. The leader and follower are the two constituents of leadership phenomena. The aspect of followership is quite neglected one.

INTRODUCTION

Much has been said about leadership. From the organizational leaders, supervisory leaders, team leaders, political leaders, religious leaders and the name can be given to any role. The most neglected aspect is the one which is named follower and the one who makes the leader worthwhile. In the most concrete and obvious term leader and follower are the two sides of a single hand. Followership, on the other hand, is rarely brought up when leadership is being discussed, in spite of its obvious importance in the grand leadership plan (Kelley, 1988). Leadership is not one-dimensional; leadership is system thinking in multiple dimensions. In terms of systems thinking, the inclusion of organizational performers (followers) in the leadership process complements the notion that leaders are only responsible for about 20% of the work that is completed in an organization (Kelley, 1992). This paper is about exploring the importance of followers in the leadership phenomenon.

Leadership is the combination of tangible skills and personality to motivate people to accomplish goals. The focus of leadership is to direct organizational performers to accomplish organizational goals in an effective and timely manner. The characteristics of leadership include goals and values. As stated by Burns (1978), leadership is "......inducing followers to act for certain goals that represent the values and the motivations – the wants and needs, the aspirations and expectations- of both leader and followers" (p. 19).

Organizations exist in every form of society and are prevalent in the basic day-to-day operations of life (Kelley, 1992) and definitions of organizations vary in many ways. Barnard (1938) defined an organization as "[a] system of consciously coordinated activities or forces of two or more persons" (p. 81). The combination of two or more persons working together implies the leader-follower scheme exists and, as with leadership styles, followers' exhibit styles of followership.

The leader-member exchange (LMX) model has been offered by Graen and his colleagues (e.g., Graen & Wakabayashi, 1994) as an alternative approach to the study of leadership. In contrast to traditional models that imply that a leader exhibits a similar leadership style toward all members of a work group, the LMX model suggests that leaders may develop different types of relations with different members of the same work group. In this respect, the model depicts leader-follower relations (exchanges) as existing on a continuum ranging from high to low quality.

The leader member exchange model proposed four grounds on which leader and follower interacts these are Attitudinal Similarity.

Similarity is one of the most central theoretical and empirical constructs in cognitive psychology (Medin, Goldstone, & Gentner, 1993). Within the field of management, the similarity-attraction effect provides the conceptual foundation for much research on organizational demography (Tsui, Egan, & O'Reilly, 1992). The LMX model suggests that attitudinal similarity is an important influence on leader and follower interactions, being a prime determinant of successful ongoing relationship.

Research Question

Rq1:   What is the relationship between followership and leadership?
Rq2:   Is followership is leadership?

Research Methodology

In order to answer the raised question the paper will use the epistemology of constructionism. The theoretical perspective will be interpretivism. The research methodology will be comparative analysis. The paper is using constructionism as the epistemology of research methodology as it is not using positivist or post positivist stance (Crotty, 1998, p.4). Further the paper is constructing the argument through the theoretical perspective of interpretivism (Woodside & Wilson, 2003). As the paper is not finding an objective truth through observation but interpreting the truth through methodology of comparative analysis (Benson, 1977).

LITERATURE REVIEW

Introversion and Extraversion:

Years of research have convinced many investigators that the twin constructs of introversion and extraversion are a central dimension of personality (McCrae & John, 1992). Introversion/extraversion is a broad dimension that deals with the interpersonal activity so important in leader-follower relations. To the extent that the LMX model suggests that followers are able to influence the quality of their interactions with leaders, it is possible that extraverted followers, seeking interpersonal relations, would attempt a high level of inter-action with leaders not only to gain the satisfaction of interacting, but also to enhance the possibility of being assigned stimulating tasks. Such behavior corresponds closely with that underlying high-quality leader-follower exchange.

Locus of Control:

Research has repeatedly shown locus of control to be an important construct for explaining workplace behavior (Spector, 1982). Individuals with an internal locus of control generally feel that they can control events in their lives and perceive personal initiative to be largely instrumental in attaining success. In contrast, individuals who generally feel that outside or environmental forces determine what happens in their lives, who are said to have an external locus of control, ascribe little or no value to initiative because they view success as to some extent unrelated to effort. Of interest here is the tendency of those with an internal locus of control (henceforth, internals) regarding situational control (Strickland, 1989). That is, because internals believe they can control a work setting through their own initiative and independence of action, they should attempt to achieve more control than do externals if they believe the control will lead to desired outcomes. Thus, as Spector (1982) predicted and Blau (1993) reported internals will probably attempt to control performance outcomes via initiative based rather than compliant behaviors. Initiative-based behaviors could include attempting negotiations relating to operating procedures and policies, work assignments, working conditions, and work schedules. In the leader member exchange model, such leader-follower negotiation is characteristic of high-quality exchanges.

Growth Need Strength

Growth need strength is a personal attribute that concerns a person's desire to grow and develop as an individual. As an explanatory construct, growth need strength is a central concept in understanding the influence of job characteristics (Kulik & Oldham, 1988). Graen and Scandura (1987) contended that having some work group members with job-growth potential (ability) and the motivation to accept challenges beyond their job descriptions contributes to the success of leader-follower exchanges.

These four dimensions of personality through leader member exchange model depict the importance of relationship between leader and follower. Through empirical findings it was clear that whenever leader and follower have a balance in their personality outcomes are more significant.

Kelly's style of follower ship:

Leader and follower are the two sides of same domain which is how to get best out of circumstances. The relationship between follower and leader exists and cannot be denied. As leader exhibits styles so the follower also exhibits style.

Kelley (1992) defined followership styles as "exemplary ... alienated ... conformist ... pragmatist ... and passive" (p. 97). These styles constitute the basis of the Kelley followership model and relate the followership styles to individual personality attributes in terms of thinking and acting in organizations. Individual thinking attributes are (a) independent critical, (b) dependent critical, (c) active, or (d) passive. These thinking attributes, like the styles of followership and leadership, give dimension to the philosophical notion of followership.

Alienated followers are mavericks who have a healthy skepticism of the organization. They are capable, but cynical.

Conformist followers are the "yes people" of the organizations. They are very active at doing the organization's work and will actively follow orders.

Passive followers rely on leaders to do the thinking for them. They also require constant direction.

Exemplary followers are independent, innovative, and willing to question leadership. This type of follower is critical to organizational success.

The Leadership-Exemplary Followership Exchange Model:

Exemplary Followership:

The style of followership coined by Kelly provides the philosophical basis for followership research. The exemplary followers are the one who makes leaders effective.

Banutu-Gomez (2004) stated that "To succeed, leaders must teach their followers not only how to lead: leadership, but more importantly, how to be a good follower: followership" (p. 143). Schaubroeck and Lam (2002) stated, "Regardless of work unit individualism/collectivism, supervisors were more likely to form trusting, high-commitment [relationships] with subordinates who were similar to them in personality" (p. 1132). This statement supports Johnson's (2003) conclusion that "...followership modality variation . . . revealed that followers generally reflect modality that corresponds with the leaders' style and behavior" (p. 110). Johnson's conclusion and Banutu-Gomez's contention that leaders must teach their followers to be good followers, displays a connection to Kelley's (1992) notion that exemplary followership can be taught. To develop exemplary followership, leaders must educate organizational performers to become exemplary followers by demonstrating the exemplary followership attributes as developed by Kelley.

The following 15 attributes define exemplary followership. Exemplary followers, according to Kelley (1992),
1. Think for themselves
2. Go above and beyond the job
3. Support the team and the leader
4. Focus on the goal
5. Do an exceptional job on critical path activities related to the goal
6. Take initiative on increasing their value to the organization
7. Realize they add value by being who they are, their experiences and ideals
8. Structure their daily work and day-to-day activities
9. See clearly how their job relates to the enterprise
10. Put themselves on the critical path toward accomplishment
11. Make sure the tasks they are to perform are on the critical path
12. Review their progress daily or weekly
13. Increase their scope of critical path activities
14. Develop additional expertise
15. Champion new ideas. (pp. 126-166)

Relationships and Culture

Building relationships while identifying with the leader of an organization and their vision is essential to good followership. Jehn and Bezrukova (2003) contended that followership is a people oriented behavior, and this behavior builds relationships between leaders and other followers, providing an environment that promotes all organizational members to focus on a common goal. Jehn and Bezrukova suggested that good followers may be a catalyst for change in an organization as followership "Inspires others to follow toward a common goal; creates enthusiasm and desire to excel; fully engages others; builds confidence; moves the organization ahead as one entity rather than separate parts" (p. 728).

As relationships are important between leaders and followers, the quality of these relationships are equally important factors in developing an organizational culture of followers who maintain the characteristics that promote good followership. Werlin (2002) contended that good followership relationships must build on motivation rather than control, and that instilling values into followers is essential to developing a culture of trust and good relationships. The balance of power between leader and follower; however, must be maintained in order to provide a culture of openness that promotes self-engagement.

A good relationship between followership to leadership requires that both leader and follower share elements of each (Schruijer & Vansina, 2002). Schruijer and Vansina contended that the characteristics of leaders and followers define the relationship that becomes followership and leadership. Wong (2003) contended that organizational cultures must involve and value all members of the organization, and that the characteristics of all members define the roles of leaders and followers. The identification and sharing of roles lead to LEFX.

Transformational Leadership and Followership

Bass (1990) suggested the implementation of transformational leadership could change followers into leaders. Humphreys and Einstein (2004) contended that transformational leadership could motivate followers to be self-directing and increase follower performance. Changing followers to become self-motivated, self-directive and a leader from within is consistent with Kelley's (1992) exemplary followership style. These examples from the literature fall short of explaining the perceptions these followers have of the change from the follower perspective, as the perspective is consistently from the leader's point of view. Dvir, Eden, Avolio, and Shamir, (2002) longitudinal field study attempted to examine follower development as opposed to leader development in terms of followership, but the result of Dvir et al.'s study contended that transformational leadership improves a follower's ability to think for themselves, thus continuing the theme that leadership makes the follower. However, exchanges of roles between leader and follower aid in the development of motivation and trust to form the LFX.

Leader Follower Roles

Townsend (2002) contended that the roles of leaders and followers change from that of follower to leader and back again, depending on the situation and demands of the organization. At times, followers can determine their faith in this role reversion, but other times, leadership must inspire the followers to be followers and eventually leaders (Jehn

& Bezrukova, 2003). Jabnoun, Juma, and Rasasi (2005) found that charismatic leaders are able to instill a sense of purpose and vision in followers who will inspire the followers to identify with the leader. Identification with the leader's vision is essential to motivating and inspiring followers to lead.

Active Engagement

Solovy (2005) stated, "Exemplary followers work beyond the expected to produce exemplary results" (p. 32). This statement provides an element of active engagement of exemplary followership, and a review of the literature (Dvir & Shamir, 2003; Johnson, 2003; Petrausch, 2002; Solovy, 2005) pertaining to followership and active engagement has yielded a connection between active engagement and followership. In a longitudinal study, Dvir and Shamir found that "collectivistic orientation, critical-independent approach, [to follower development] active engagement in the task, and self-efficacy, positively predicted transformational leadership among indirect followers" (p. 327)

Theories by Kelley (1992), Barnard (1938), and Chaleff (2003) implied that good followers actively engage and think for themselves. This supports the relationship between active engagement and followership in a way that complements the theories. The systems that support follower active engagement remain diverse in the developmental process, leader influence; individual performer character, learning, and the follower understanding of their role in an organization are key factors in developing a good followership mentality that supports active engagement. To implement change in an organization, the exemplary follower must understand transformational change and the role the follower has in transformation.

Both leadership philosophies of Kelley (1992) and Barnard (1938) emphasize teams as well as informal and formal organizations. Barnard's philosophy contends that an organization "... is a system composed of the activities of human beings" (p. 77). This is in essence a team, and as stated by Barnard's observation that cooperation is essential for an organization to function, suggests the notion of teamwork. This realization of cooperative systems is a germinal element of teaming and an integral part of followership. In comparison, Kelley (1992) embraced teaming as a component of followership. Followership promotes self-reliance among team members, and this self-reliance provides leaders with less need to lead and thus, develops followership (Kelley).

A model for Leadership-Followership Exchanges

As long as there have been leaders, there have been followers, and leaders cannot accomplish what they do without followers (Kelley, 1992). Newell (2002) suggested that a growing trend in leadership is to inspire followership, and to this end, coaching and mentoring leaders to transform their followers into good followers is essential in today's business environments. Managers must participate actively in the forming of good follower relationships (Vince, 2002) if managers are to benefit from the Leader-Follower Exchanges that promote sharing organizational goals consistent with enterprise wide vision and values. Figure 1 the Leadership-Exemplary Followership Exchange model illustrates the cycle of leadership-Exemplary Followership Exchanges based on relationships and culture, transformational leadership and followership, leader follower roles, active engagement, and development of exemplary followership as defined by Kelley (1992).
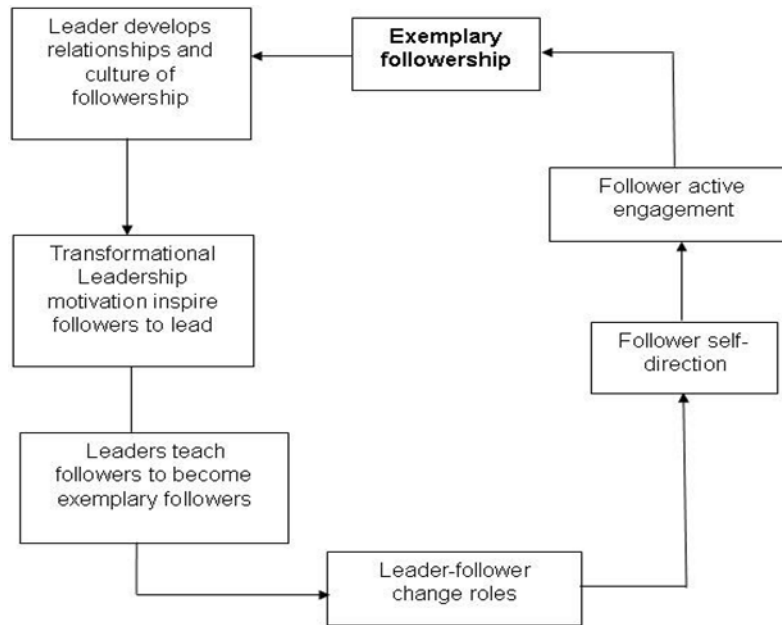
Fig. 1: Leadership-Exemplary Followership Exchange (LEFX) Model

The concept developed by the LEFX model provides for a culture of organizational leadership that originates from the bottom up. Relationships developed between leaders and followers must be open to dialogue regarding the vision of the organization. Shared vision between leaders and followers will develop a culture of trust and lead to active engagement of followers. Leaders must educate follower to be exemplary followers and as such, provide followers with a sense of confidence that they have the knowledge to lead themselves as an active engaged member of the organization.

This model provides a cycle of relationship between leader and follower. It presents a framework for the exemplary followers to become leaders in the future.

Overcoming Adversity: The Impact of Leadership Attributes or Traits
1. Honesty or integrity
2. A high level of people skills
3. Initiative, assertiveness, drive, or determination
4. Excellent communication skills or willingness to speak up, take a Position, or take charge
5. Vision (being forward-looking)
6. Desire or passion to lead and inspire
7. Positive attitude and self-confidence; charisma
8. Knowledge of the business and/or group task at hand; competence
9. The ability to overcome adversity or obstacle
10. Being a Servant-Leader, serving people, and especially being humble

11. Having both religious faith and strong family ties
12. Framing or recognizing the worst adversity as an opportunity
13. Having a mentor or mentors in their development as leaders

Haller (2008, pp.13-14)

Leadership Attributes or Traits, and Transformational Leadership Research

Starting back in the 1980s there was a resurgence of researchers updating the academic literature with their findings, repackaging, and comments leadership trait theory. Many of the leadership scholars focused there framing on leadership traits in the context of discussing transformational leadership.

Review of Recent Research on Individual Traits or Attributes

The findings, re-naming and framing of trait theory and transformational, or situational leadership research was led by scholars such as, Blanchard and Johnson (1982), Blanchard, Zigarmi, and Zigarmi (1985), Kouzes and Posner (2002), Peters and Waterman (1982), Peters and Austin (1985), and Peters (1987). Peters and his co-authors commented on trait theory by adding their concept of "excellence" as the objective of leadership success. Much of the leadership theory research focused on the important effects of being a transformational leader.

A great number of the studies done on traits by researchers in the first half of the twentieth century used young children or high school/college students as their subjects (Bass & Stogdill, 1990, pp. 59-77). Much of the research done on leadership traits after 1950 focused on business managers, major company CEOs, and recent college graduates entering management training programs in large firms (pp. 78-88).

By the second half of the twentieth century, the theory that leaders were "born" had been rejected by several major researchers, including Bennis (1989, p. 5), Gardner (1990, p. xv), and Kotter (1990, pp. 103-107). Van Fleet and Yukl (1986) held that certain characteristics improved a leader's chance of success and that those characteristics included initiative and fortitude.

Mann's (1959) research on leadership documented the positive relationship between the personal traits of intelligence, adjustment, extroversion, dominance, masculinity, and sensitivity. The work by Jago (1982) asserted that there is a set of qualities or characteristics which can be attributed and measured in those who are perceived to successfully employ such characteristics (pp. 317-319).

Jago concluded that leaders' behavior is determined by their attributes. Their characteristics, knowledge, and skills, which he called "qualities," influenced their behavior. Jago focused specifically on how these qualities of a leader interact with the leader's perception of group attributes, the particular task at hand, and the general context of the situation (pp. 315-336).
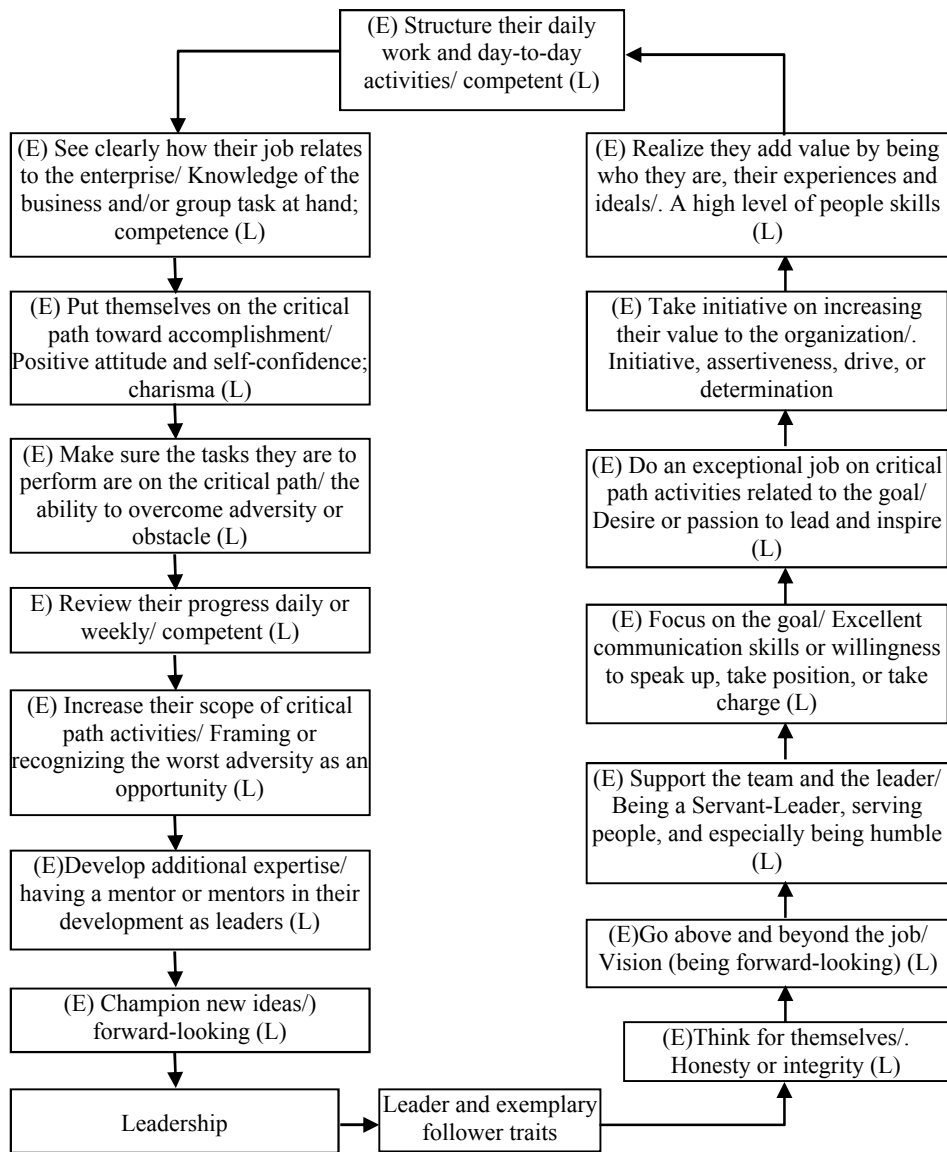
Kouzes and Posner's (2002) extensive research identified respected and admired characteristics in leaders necessary to "make or build" a leader. Kouzes and Posner identified nineteen qualities or characteristics as being the most admired in leaders; which they claimed were consistent over time and across six continents (pp. 24-25). Their list

started with "honest," which was selected by 88% of the respondents (pp. 24-28). Their other top three traits were: (a) forward-looking, (b) competent, and (c) inspiring, having been selected by between 58% and 73%. A fifth quality, "intelligent," received a 47% response rating from the survey participants (pp. 25-26). Kouzes and Posner administered their survey over a period of twenty years to over 75,000 participants, including ten thousand mangers and business executives and a limited number of government managers (p. 24).Haller (2008, pp.13-15)

An integrated model of Exemplary followership is leadership:

With the help of traits of exemplary follower and universally accepted leadership traits a model for followership is leadership is developed here which can support the assumption exemplary followership is leadership in certain contexts of organizations. An exemplary follower can take the role of leader in a situation where he as an exemplary follower will act as a leader.

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                        ┌─────────────────────┐
                        │ (E) Structure their │
                        │  daily work and     │
                        │  day-to-day         │
                        │ activities/         │
                        │ competent (L)       │
                        └─────────────────────┘
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| (E) See clearly how their job relates to the enterprise/ Knowledge of the business and/or group task at hand; competence (L) | (E) Realize they add value by being who they are, their experiences and ideals/. A high level of people skills (L) |

| (E) Put themselves on the critical path toward accomplishment/ Positive attitude and self-confidence; charisma (L) | (E) Take initiative on increasing their value to the organization/. Initiative, assertiveness, drive, or determination |

| (E) Make sure the tasks they are to perform are on the critical path/ the ability to overcome adversity or obstacle (L) | (E) Do an exceptional job on critical path activities related to the goal/ Desire or passion to lead and inspire (L) |

| E) Review their progress daily or weekly/ competent (L) | (E) Focus on the goal/ Excellent communication skills or willingness to speak up, take position, or take charge (L) |

| (E) Increase their scope of critical path activities/ Framing or recognizing the worst adversity as an opportunity (L) | (E) Support the team and the leader/ Being a Servant-Leader, serving people, and especially being humble (L) |

| (E)Develop additional expertise/ having a mentor or mentors in their development as leaders (L) | (E)Go above and beyond the job/ Vision (being forward-looking) (L) |

| (E) Champion new ideas/) forward-looking (L) | (E)Think for themselves/. Honesty or integrity (L) |

| Leadership | Leader and exemplary follower traits |

Exemplary follower ship is leadership (E for exemplary followership traits, L for leadership traits)

Kelly's followership basis:
   Followership, for example, sounds like the words of Jesus, who chose his disciples with the command, "Follow me" (NAS: Mat. 4:19, 9:9, 16:24, 19:21, Mar.1:17, 2:14, 8:34, 10:21, Luk. 5:27, 9:23, 18:22). In fact, in the four gospels, the word follow occurs 91 times. Actually, however, Kelley traces his inspiration to a moment of boredom in a

hotel room (1992, p. 22) where his eyes came to rest on a bible, presumably provided by the Gideons. This caused him to reflect on religions in general—Buddhism, Hinduism, Judaism, Islam and Christianity.

And he began to consider how Christ's followers—not Christ himself—changed the world. This is how Kelley's thinking on followership began.

Similarly, Greenleaf's concept of servant leadership could conceivably have been inspired by Christ. In Mark (10:43-45), Jesus tells his disciples "whoever wishes to become great among you shall be your servant; and whoever wishes to be first among you shall be slave of all. For even the Son of Man did not come to be served, but to serve, and to give His life a ransom for many." And in John (13:14-15), Jesus says, "If I then, the Lord and the Teacher, washed your feet, you also ought to wash one another's feet. For I gave you an example that you also should do as I did to you. " Though Greenleaf does freely refer to various events and statements from the life of Christ, Greenleaf only once quotes one of Jesus' servant statements though the mouth of Mr. Billings, a character in Teacher as Servant (1979, p. 28)

This initial thinking of Kelly towards followership is supporting the notion that followership is leadership varying to different contexts of organizations.

DISCUSSION

Barack Obama: An exemplary Follower

Born to a Kenyan father and an American mother, Barack Obama has a multiracial heritage. He made history when he was elected as the 44th President of the United States of America, as he is the first African American to hold this post. Though, young and inexperienced as he has not spent much time in Washington, Barack Obama has worked for the last twenty years as a community organizer, a civil rights attorney, a constitutional law professor, a State Senator and then U.S. Senator.

He was hired as Community organizer by Developing Communities Project, a church based community organization. The organization wanted a young black man to help them collaborate with black churches in the south side. From 1985 to 1988, Obama worked there as Director of the organization. He helped blacks fight for their rights from the city government. He worked to improve the living conditions of poor neighborhoods which faced crimes unemployment. Working in a small organization taught him organizational skills. He was always good with words and was known for making speeches which people could emotionally connect to. He worked with Saul Alinsky whose method was "agitation" which meant getting people angry enough about their current state of things that they are compelled to take some step and do something. During his tenure at Developing Communities Project, the staff at this organization grew from 1 to 13 and so did their budget. Then, he worked as consultant and instructor for Gamaliel Foundation, a community organizing institute.

Barack Obama felt that law was a medium which could facilitate activism and community organization. So in late 1988, he entered Harvard Law School. In his second year at college, in 1990, he was elected as the president of law review. This role required him to be editor- in-chief and supervisor of law review staff of about 80 editors. As he

was the first black to be elected for this position, it was a widely reported and much publicized event. It had taken Obama long sessions of discussion with conservatives to support him. While still in law school in 1989, he worked as an associate at Sidley and Austin law firms. He met his future wife Michelle, also a lawyer, here. Newton Minnow was a managing partner here. Minnow, later introduced him to many of the Chicago's top leaders. In the summer of 1990, he worked at Hopkins and Sutter and finally graduated from Harvard in 1991; after which he again moved back to Chicago where he practiced as a civil rights lawyer. His could have easily taken up a god job after Harvard but his values and mother's teachings had taught him to do something for the society and the less privileged ones. The publicity that he garnered at Harvard, because of his election as first black president of Harvard law review, led him to an offer by University of Chicago law school to write book on racial relations. Meanwhile, Barack Obama also taught Constitutional Law at University of Chicago Law School from 1992- 2004; first as a Lecturer from 1992 to 1996 and then as Senior Lecturer from 1996 to 2004. Barack had also joined Davis, Miner, Barnhill and Galland law firm as civil rights attorney. He was an Associate in this law firm from 1993 to 1996 and then counsel from 1996 to 2004. Barack served on the board of Directors Woods Fund of Chicago, Joyce foundation form 1994 to 2002. In 1992, he became the founding member of board of director of Public Allies but resigned in 1993 and his wife joined it. All these years in Chicago, he served on board of directors of Chicago Annenberg Challenge, Chicago lawyers Committee for Civil Right under Law, the Centre for Neighborhood Technology and Lugenia Burns Hope Center.

In 1992 election he had organized largest voter registration drives, Project Vote, in history of Chicago from April to October 1992. He had with him a staff of ten and around seven hundred volunteers. They had the goal of registering around 150,000 African Americans in the state who were unregistered. It was one of the most successful voter registration drives one had ever seen. Barack's work led him to run for Illinois State Senate. Eventually, he was elected in 1996 November, succeeding State Senator Alice Palmer, as Barack Obama was the only candidate left, after rest of the petitions were invalidated..

He went on to serve three terms in the Illinois State Senate, from the year 1997 to 2004. Barack lost a primary run for U.S. House of Representatives to Bobby Rush in a very close fight in the year 2000. In the year 2003, he passed legislation to expand healthcare coverage to 70,000 children making Kid care, state Children's Health insurance program, permanent. The legislation also extended health insurance to uninsured parents, which added up to additional 84,000 parents. After he found there were 13 innocent death row inmates, Barrack saw to it that death penalty reforms were changed. Also, Illinois became the first state where videotaping an interrogation became mandatory. Even Law enforcement agreed that recording questioning would help the prosecution's chances. As the Chairman of Illinois Senate's Health and Human Services Committee, Barack Obama unanimously led a legislation to be passed on racial profiling by the police, which means maintaining records of the race, age and gender of the drivers detained. For low income families, Obama created Illinois Earned Income tax credit which offered tax relief.

Barack Obama came into national limelight with an inspiring speech at July 2004 Democratic National Convention where he spoke against the Bush administration's policies on Iraq war. His speech was the highlight of the convention and people who saw it knew that he was an emerging star. Barrack is a great orator, at par with Martin Luther King Jr. and often compared with John F Kennedy. People wait for hours to hear him speak. During his presidential campaign he drew huge crowd. He has a flair for consensus building and he loves addressing crowds. His wife Michelle Robinson is a Harvard Law School graduate. Michelle and Barack had their first daughter, Malia Ann in 1998 and second daughter Natasha, known as Sasha in 2001. His second book, Audacity of Hope: Thoughts on Reclaiming the American Dream was out in October 2006 and he won the Grammy for Best Spoken Word Album for audio version of this book too. As a writer, Barack is very talented and is an introspective writer. Barack is a devoted basketball player and a Chicago White Sox and Chicago Bears fan. Though his father was brought up with Islamic faith, he was an atheist by choice, however, Barack follows Christianity.

By middle of 2002, he started thinking about running for U.S. Senate and formally, announced his candidacy in 2003 for U.S. Senate. On 2nd November 2004, he won the election by a great victory margin and was finally, elected to the US Senate, following which he resigned from Illinois State Senate. Barack Obama became the fifth African American senator in the history to do so. Till 2006, Obama held minority appointments like Foreign relations, Environment and Public Works, Veteran's Affairs on Senate committees. He took additional major assignments of Committee of Health, Education, Labor and Pensions and Committee on Homeland Security and Government Affairs at the start of 2007. While in U.S. Senate Foreign relations Committee, Barack visited Iraq to witness the war. In January he even introduced a legislation to end the Iraq war. He went against the conventional thinking of U.S. and had the courage to oppose the war. He also traveled to Russia and Africa. Right through his career he has spoken about his opposition to the Iraq war and to providing universal health care, which he focused on even in the presidential campaign. Obama made efforts to correct the disparity that existed in the state of Illinois where veterans were receiving less disability benefits as compared to other states. As a result more disability claims specialists were hired for the regional office in Chicago and claims of veterans were re-examined. Education was his top priority during his Senate years. He passed a legislation to carry summer education programs which emphasize mathematics and problem solving skills. He worked on to get black colleges eligible for grant money.

As a member of minority party in 109th congress, Barack created legislation to control conventional weapon and nuclear material smuggling. It became a law in 2007. Along with Senator Tom Coburn, Barack Obama passed a law to bring more transparency in the system. According to him, every American citizen has the right to know where his tax money goes and that information should be made available to them. He has worked on accessibility of renewable fuels. In 2007, Barack confronted both the parties and proposed ethics legislation which imposed subsidized corporate jet travel, restrictions on sponsored trips by lobbyists and disclosing lobbyists contributions became mandatory. All these became part of the final bill which became a law. He passed legislation where he demanded that gas stations be given tax credits who have installed

E85 ethanol refueling pumps. He also sponsored a law for providing 40 million $ for commercialization of a hybrid car. In the 110th congress, he helped in creating legislation regarding lobbying and electoral fraud, nuclear terrorism and care for US military personnel returning from Afghanistan and Iraq. He passed a bill to help the families of servicemen who return injured from these countries and demanded that the families should get a job protection of 12 months for taking care of their loved ones. Obama sponsored a number of bills in U.S. Senate, 136 in total, of which two of them have become law. Additionally, he also co-sponsored 619 bills in his tenure at U.S. Senate.

Obama declared his candidacy for the 2008 Democratic Presidential nomination in February 2007 at Old State Capitol building in Springfield, Illinois. Of the large number of candidates who filed for nominations as presidential candidates, only two remained in the contest; Senator Hillary Clinton and Obama. On the 3rd of June 2008, Obama became the presumptive nominee, one who is assured of his nomination but not officially announced by the party. In August 2008, Barack Obama accepted the nomination and he was in race against the republican nominee, John McCain. On November 4, 2008, Obama won the presidential election by a big margin. He delivered his victory speech at Chicago's Grant Park in front of thousands of supporters. There were, not only nationwide but, worldwide celebrations on his victory; even in his father's home country, Kenya.

His stance on ethics, stressing on government transparency, education as his priority with his reform "No Child left behind" and providing affordable and accessible health care to all, has made him a favorite of many Americans and people have very high hopes from him.

How a black man became the President of USA?

Exemplary Followership,

As a community worker follower of community rules

As an Exemplary Follower challenged Bush's Policy of War on Iraq

As an exemplary follower of Senate Introduced legislation against nuclear arms smuggling

As an exemplary follower of senate introduced legislation against racism

An exemplary follower ultimately became a leader of USA, when elected as the president of USA

The Second Caliph of Muslims: Hazrat Umer (RA)
Umar's services to Islam before his Khilafat (Caliphate)
Hazrat Umar (R.A.) had great love for Allah and the Holy Prophet (PBUH). He participated in almost all the big battles: Badr, Uhad, Ahzab, Khaibar, Hunain etc. In the expedition to "Tabuk" he gave half of his wealth in the path of Allah. He was next to Hazrat Abu Bakr (R.A.) to sacrifice his belongings for the cause of Allah.

The Holy Prophet (PBUH) also had a deep love for him. Once he remarked, "were a prophet to come after me, he would have been Umar". In another Hadith mentioned in

Bukhari, Hazrat Abu Hurairah (R.A.) narrated that the Holy Prophet (PBUH) said, "In Bani Isra'il (Israelites) there were people who were not prophets but talked to Allah. Were anyone in my Ummah (people) like those persons, he would be Umar".

The death of the Holy Prophet (PBUH) was a great shock to him, and he could not believe it until Hazrat Abu Bakr (R.A.) reminded him of a clear verse of the Holy Qur'an on the subject. He then went to the Council Hall along with Hazrat Abu Bakr (R.A.) where the people of Medina had assembled to select the First Caliph. Hazrat Umar (R.A.) was the first person to pledge loyalty at the hand of Hazrat Abu Bakr (R.A.), and then helped him throughout the duration of his rule.(exemplary followership).

Hazrat Umar (R.A.) as the Second Caliph of Islam (Leader as an Exemplary Follower)

As described in connection with the life of Hazrat Abu-Bakr, during his illness he consulted the "Shura" about the next "Khilafat" and then gave his decision in favor of Hazrat Umar (R.A.) who took the charge of Caliphate after the death of Hazrat Abu Bakr (R.A.) on 22nd of Jamadi-uth-Thani 13 A.H. (23rd Aug. 634 A.C.).Umar (R.A.) followed fully the ways of the Holy Prophet (PBUH) and the policy of his predecessor with his characteristic zeal and vigor. It was his strict adherence to the "Sunnah" of the Holy Prophet (PBUH) which helped him to subdue the mighty empires of Persia and Byzantine.

The Severe Famine & Plague

In the year 17-18 A.H., Hijaz (Northern Arabia) and Syria were faced by a severe famine and drought. Hazrat Umar (R.A.) took steps to get food supplies from Egypt, part of which had been conquered by Hazrat'Amr bin al-'As (R.A.). He sent three big ships of grains to Medina which was unloaded in the presence of Hazrat Umar (R.A.). He himself distributed the grains among the needy. Hazrat Umar (R.A.) did not take any delicacy (butter etc.) during the famine period. When he was requested to take care of his health he said, "If I don't taste suffering, how can I know the sufferings of others?"

When the famine became intolerable he prayed to Allah in a big gathering of Muslims. It has been narrated that the prayers had not even finished when rains started to pour down.

About the same time plague spread in most parts of Iraq, Syria and Egypt and it caused great havoc not only to civilians but also to the Muslim armies. After the plague Hazrat Umar went to Syria to inspect the losses caused by the plague.

Review of Hazrat Umar's service to Islam

The period of Hazrat Umar's caliphate undoubtedly is the "Golden Age" of Islam in every respect. He was a man of extraordinary genius who not only molded the destiny of the nation but made history of his own. He followed the footsteps of the Holy Prophet (PBUH) to the fullest extent. It was Umar under whose rule Islam became a world power and the mighty empires of Persia and Byzantine (Eastern Roman) crumbled before the arm of Islam. Within ten years of his glorious rule, the whole of the Persian Empire, Syria, Palestine, Egypt and a part of Turkey came under the banner of Islam and the nations entered the fold of Islam.

Character

He was a very pious Muslim. His success lay in two things-fears of Allah and his love for the Holy Prophet (PBUH). Hazrat Umar was the most just ruler in the Islamic History. All the citizens, including the Caliph himself, were equal before law.

Preaching of Islam

As the viceroy of the Holy Prophet (PBUH) his foremost duty was to spread and preach Islam. As mentioned above, the aim of various battles and wars was to clear the way for the Muslims for preaching Islam. Whenever any army had to attack a place it had to call the inhabitants of the place to Islam. Hazrat Umar was very strict in this respect and he had given standing orders to the commanders not to start war unless they had first invited the people to Islam. If they accepted it, there was no question of war and if they did not, then the war was fought only with those who were not giving a free hand to Muslims to preach the Right Path. No Person was ever forced to forsake his own faith and accept Islam.

The method adopted to preach Islam was demonstration by actual practice. For this purpose he ordered Muslims to establish their own quarters and present the practical shape of Islam before the population. Seeing the truthful way, the inhabitants of the glace were attracted towards Islam. No soldier was allowed to take any property or anything by force from the conquered people.

Because of fair treatment by the Muslims sometimes the whole army of the enemy accepted Islam. After the battle of Qadisiya a battalion of four thousand Persians accepted it. After the victory of Jalula, the chiefs of the place entered the folds of Islam along with the inhabitants. A commander of the army of Yadzgird, named Siyah accepted Islam with his battalion during a battle in Persia. All the inhabitants of the town of Bulhat in Egypt accepted Islam at one time without the use of any force only by seeing the piety of Muslims. A rich merchant and the chief of a place in Egypt, named Shata, accepted Islam with all the inhabitants of the place only after hearing about the character and piety of Muslims at the time when Muslims had not even reached that place. These are orally a few examples to show that Islam spread because of the character of Muslims at that time.

Umar (R.A.) was very strict in ensuring that no Muslims forced any non-Muslim to accept Islam. Through his advice, letters and addresses he made it clear to all the Muslims that they had to adhere to the ways of the Holy Prophet (PBUH) which was the only method to preach Islam.

Umar the pioneer of the Islamic democracy

Hazrat Umar (R.A.) was the pioneer of modern civilization to form a state based upon the Islamic democratic system, the system which was incorporated in the West as late as 19th and 20th centuries. He was the greatest democratic administrator whose example is unparalleled not only in the history of Islam but also in the history of modern civilization. A vast part of the Middle East, Persian Empire and Byzantium, was conquered during the ten years of his "Khilafat" (Caliphate) which he consolidated into a state governed by Islam i.e. laws. He remarked, "It is essential for a "Khilafat" to consult his "Shura". Once he said, "I do not desire that you may follow anything that arises from my caprice".

Hazrat Umar had clearly stated on various occasions that he should be obeyed as long as he was obeying Allah and the Holy Prophet (PBUH).

Thus we see that Hazrat Umar's period was the Golden Age of the Islamic history when Islam was practiced in its true form. Hazrat Umar (R.A.) the words of the Holy Prophet are very true

> "IF THERE WERE TO BE A PROPHET AFTER ME HE WOULD HAVE BEEN UMAR IBN AL-KHATTAB." *(Tirmidhi)*

AND

> "AMONG THE NATIONS BEFORE YOUR TIME THERE HAVE BEEN INSPIRED PEOPLE (WHO WERE NOT PROPHETS), AND IF THERE IS ONE AMONG MY PEOPLE HE IS UMAR". *(Bukhari and Muslim)*

What was the reason behind Hazrat Umer's superiority over others, that is exemplary followership. He as an exemplary follower obeyed Allah and Holy Prophet (PBUH). He was the leader of Muslim Ummah but in true meanings he was an exemplary follower of Prophet's guidelines.

CONCLUSION

Leadership is everywhere in every aspect of society. The leader and follower are the two constituents of leadership phenomena. The aspect of followership is quite neglected one. In this paper through the help of LMX model and Kelly's followership styles a model for exemplary followership is the leadership is developed. This model suggests that depending on the circumstances exemplary follower takes the role of leader. At the end of these paper examples of Barack Obama and Hazrat Umer Farooq, supports this model. Both are exemplary followers and when the circumstance favored them they acted as leader.

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INVESTIGATION OF FACTORS RELATED TO ACADEMIC PERFORMANCE USING CORRESPONDENCE ANALYSIS AND SELF ORGANIZING FEATURE MAP

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ABSTRACT

For the last 20 years, education in Pakistan is growing as a profitable industry with prime objective of maximizing profit by delivering high quality education that produces well-educated, skilled, mannered students according to needs and requirements of the dynamically growing market. In this study we want to investigate different factors affecting the academic performance and which factor(s) are more important to consider for a particular academic performance. We want to investigate critical attitude of students about learning effects academic performance. For this study the population was all students of social sciences and now studying in 4th semester and who enrolled in 2007 and we select sample of 300 students using stratified random sampling with proportional allocation. Multiple Correspondence analysis and Self Organizing Feature Map are used to investigate factors related to academic performances. We conclude that questioning in class, attendance percentage, group discussion and attend seminars effects academic achievements. Results of this study shows the importance of evaluating factors such as, Learning skills, Study Habits, and interaction with instructor group discussion. Specifically, learning skills is important factor associated with academic performance.

KEYWORDS

Academic Performance, Learning Skills, Multiple Correspondence Analysis, Self Organizing Feature Map.

1. INTRODUCTION

In developing countries universities have high pressure to increase productivity. One of the leading challenges faced by higher education institutions is to predict the academic path for students. Difficulties faced by university students have been a frequent concern for higher education institutions for various reasons: the generalized concept that an improvement in achievement implies a higher graduation rate, the increasingly frequent association of academic achievement with budget issues, the need for the universities to improve their students achievement standards because of pressure by credit agencies, requirements of prospective employers, and competence with other universities[Ayan (2008)]. Accurately predicting student's performance is useful in many different contexts in universities. For example, identifying exceptional students for scholarship is an essential part of the admission process in undergraduate and postgraduate institutions and

identifying weak students who are likely to fail is also important for allocating limited tutoring resources [Nghe, et al. (2007)].

Academic Performance:

Academic Performance means that things. The ability to study and remember facts, being able to study effectively and see how facts fit together and form larger patterns of knowledge and being able to think for yourself in relation to facts and thirdly being able to communicate your knowledge verbally or down on paper. Thereby, performance is the application of a learning product that at the end of the process provides mastery. The acquisition of particular grades on examination indicate candidates ability, mastery of the content, skills in applying learned knowledge to particular situation. Academic competency, in general, measures how a student copes with the academic course load and whether the student understands what was taught in the course. It also reflects whether the student was interested in and enjoyed the classes that were offered in the curriculum. Thus, it can be argued that a student with better academic competency will probably demonstrate better academic performance.

Academic achievement and retention are prevalent themes in higher education literature. In educational institutions, success is measured by academic performance, or how well a student meets standards set out by institution itself. The tracking of academic performance fulfills a number of purposes. Areas of achievement and failure in a student's academic career need to evaluate in order to foster improvement and make full use of learning process.

Among colleges and universities, there is an urgent need to compete for and retain academic talent. Setting and achieving enrollment and retention goals is critical, but this requires a thorough understanding of the existing student population, the current enrollment with regard to external and internal admission requirements, and strategic institutional direction. Student retention is one of the most important measurements of an institution's success, affecting public image, university ranking, funding opportunities and revenue. In fact, U.S. News and World Report uses freshmen retention rates as a primary benchmark in its annual ranking of public and private universities. And many factors can affect student retention, including the caliber of students recruited and enrolled, the appropriate matching of students to major, and student access to learning support service.

Different reports shows that even though enrollment in higher education institutions and the proportion of graduates entering colleges and universities have been steadily increasing, graduation rates have not kept pace and have remained remarkably flat. Academic failure at the under graduate level, particularly in the first year of study, is one of the main reasons for non-degree completion and consequently needs to be addressed to reverse the trend in drop-out percentages. The challenge of designing an educational intervention of any kind in higher education has been of great interest to many a researcher and/or educator, over the years. In the past 25 years, research in academic prediction has centered on graduation, withdrawal, failure and selection of students on the basis of either collegiate success or cumulative results of remedial; and literature to date suggests no loss of interest.

In designing an instructional intervention of any kind one needs to accomplish at least three tasks: 1) determine the factors that are relevant to successful performance of the task at hand, 2) identify those individuals most likely to benefit from the intervention, 3) evaluate the impact of any new program on students performance. The first task mentioned above means a careful delineation of the problem. Given the large number of possible variables, it is not surprising that individuals have different ideas based on different assumptions about what causes subpar performance or performance enhancement. Laying these different ideas out" on the table" may provide the group as whole an opportunity to attack the problem in the best way possible. The second major task, identifying the appropriate individuals with which to use the intervention, may typically mean identifying students who might be termed "at risk". These are the students who are in danger of failing a class, not understand a certain concept, etc. However, some interventions might be targeted at different levels of performance (for example, the "gifted students" might be chosen for some supplemental instruction). Finally, it is always critical to evaluate the intervention. This step has many purposes. The most obvious is that it lets the research team (and funding agent) know whether or not a given intervention worked. In addition, evaluation can be used to shape the research program and guide it toward a more effective intervention [Edward, et al**. (**1996)].

Student's academic performance and graduation rates have been the area of interest for higher education institutions. Investigation of factors related to the academic performance of university students become a topic of growing interest in higher educational circle. Many recent studies were carried out to explore factors that affecting university student's academic performance.

Objectives
1. To investigate which factor(s) are more important to consider for a particular academic performance.
2. To investigate critical attitude of students about their learning's effect on their academic performance.
3. To predict the students at risk or not with respect to their degree by using Self Organizing Feature Map (SOM).

2. LITERATURE REVIEW

This section focuses on literature that is reviewed from the past studies conducted at different years in the world to support our research as well as to show the importance of the topic.

Sansgiry, et al. (2004) conducted a study to assess the factors that affect the academic performance of pharmacy students at 2 universities with different student's enrollments. 244 students were participated in the study. Academic progression influence academic competency, time management, and study strategies. Findings also showed that academic progression not positively influence academic competency, test competency, time management, and study strategies.

Vandamme, et al. (2005) carried out a study to find out the factors that influence student performance and explore prediction methods. The main aim of this study is to

classify students into three groups: 'low risk' students, 'medium risk' students, and 'high risk' students. Neural Network, Decision tree and Discriminant analysis was used to predict the achievement of freshmen. In this study discriminant analysis performs better than neural network.

Different researches have been focused on comparing the performance of different methods for prediction of academic performance of university students.

Ibrahim and Rusli (2007) conducted a study for predicting students' academic performance. Three predictive models had been developed namely Artificial Neural Network, Decision Tree and Linear regression. The result of this study showed that all of three models produce more than 80% accuracy. This study concluded that performance of Artificial Neural Network was better than others.

Ayan and Garcia (2008) carried out a study to measure the university students' academic achievements. For this purpose linear and logistic regression model was used. Prior achievement and demographic factors used as predictors. The basic objective of this paper was to compare the result of both techniques and explore the most suitable method in terms of goodness of fit and predictive power. This study concluded that grades were positively related to achievements. Results showed that logistic regression is a better approach as compare to linear regression. In presence of ill-fitting patterns, logistic regression provides more stable estimates.

Mohd, et al. (2008) conducted a study to predicting students' academic achievement by comparing Logistic Regression, Artificial Neural Network, and Neuro-fuzzy. Academic performance was measured by cumulative grade point average (CGPA) upon graduating. Three models were used for prediction that was Logistic Regression, Artificial Neural Network, and Neuro- fuzzy. Performances of all the models were evaluated by root mean squared error (RMSE).

Oladokun, et al. (2008) presented a study on predicting student academic performance. In this study an Artificial Neural Network (ANN) model was used for predicting the student performance as being the university student. A model based on Multilayer Perceptron Topology was used and trained using data spanning five generations of graduates from engineering department of university of Ibadan. Results showed that the prediction accuracy of ANN model is 70%.

Erimafa, et al. (2009) carried out a study to predict the class of degree obtained in university system by using discriminant analysis. By using stepwise approach we found two variables made significant independent and combined contribution. The linear discriminant function correctly predicted 87.5% of graduating student's class of degree. Through this function we get hit ratio of 88.2% when generalized, as a valid tool to classify fresh students of unknown group membership.

3. DATA AND METHODOLOGY

3.1 Source of Data:

Population of study consisted of all students of social sciences studying in 4th semester and they enrolled in 2007 session of BS and MA/MSc program of University of

Gujrat Hafiz Hayat Campus. Our population consisted of 708 students. We Calculated the Sample size as:

$$n = \frac{N}{1 + Ne^2} \qquad \text{(Yamne, 1967)}$$

where n and N are sample and population size respectively and 'e' is margin of error. Let the e = 0.04 and N = 708 then our required sample size is 300. The students of social sciences (Statistics, Sociology, CSIT, Business Administration, and English) are not homogeneous with respect to academic performance across disciplines and programs (BS and MA/Msc). We have used stratified random sampling with proportional allocation.

3.2 Survey Instrument:

A well-structured questionnaire will be used as research instrument for data collection**.** There are 37 items using a 5-point Likert-Scale.

3.3 Data Analysis Techniques

For the purpose of data analysis we have used multiple corresponding analysis and self organizing feature map (SOM).

3.3.1 Correspondence Analysis:

Correspondence analysis (CA) is a multivariate statistical technique developed by Jean-Paul Benzécri. It is conceptually similar to principal components analysis, but scales the data (which must be non-negative) so that rows and columns are treated equivalently. It is traditionally applied to contingency tables. Correspondence analysis is an exploratory data analytic technique designed to analyze simple two-way and multi-way tables containing measure of correspondence between the rows and columns. As opposed to traditional hypothesis testing designed to verify a priori hypotheses about relations between variables, exploratory data analysis is used to identify systematic relations between variables when there are no a priori expectations as to the nature of those relations.

Correspondence analysis is also a (multivariate) descriptive data analytic technique. Even the most commonly used statistics for simplification of data may not be sufficient for understanding of the data. Simplification of data provides us useful information about the data, but that should not be at the expense of valuable information. Correspondence analysis remarkably simplifies complex data and provides a detailed description of every bit of information in the data, yielding a simple, yet comprehensive analysis. Correspondence analysis has several features that differentiate it from other techniques of data analysis. An important feature of correspondence analysis is the multivariate treatment of the data through simultaneous consideration of multiple categorical variables. Another important feature is the graphical display of row and column points in bi plots, which can help in detecting structural relationships among the variable categories and objects. Finally, this analysis has highly flexible data requirements.

Correspondence analysis is also called corresponding mapping, perceptual mapping, correspondence factor analysis or principle component analysis of nominal data.

Correspondence analysis measures the distance between nominal variables on a map, where each variable is associated with each other. However Correspondence Analysis

and Principal Component Analysis are used under different conditions. Principal components analysis is used for tables consisting of quantitative measurement, whereas correspondence analysis is applied to contingency tables. Its major goal is to transform a table of numerical information into a graphical display, in which each row and each column is depicted as a point. The usual procedure for analyzing a cross-tabulation is to determine the probability of overall association between rows and columns. The significance of association is tested by the Chi-square but this test provides no information as to which are the significant individual associations between row-column pairs of the data matrix. Correspondence analysis indicates how the variables are related, not just that a relationship exists.

3.3.2 Self Organizing Feature Maps (SOM):

Self-Organizing Feature Maps (SOFM) also known as Kohonen Self-Organizing Maps or just Self-Organizing Maps, or SOMs for short, are a type of neural network. They were developed in 1982 by Tuevo Kohonen. Self-Organizing Maps are appropriately named. As "Self-Organizing" is for the reason that no supervision is required. SOMs learn on their own through unsupervised competitive learning. "Maps" is because they attempt to map their weights to conform to the given input data. The nodes in a SOM network attempt to become like the inputs presented to them. In this sense, this is how they learn. They can also be called "Feature Maps", as in Self-Organizing Feature Maps. Retaining principle 'features' of the input data is a fundamental principle of SOMs, and one of the things that makes them so valuable. Specifically, the topological relationships between input data are preserved when mapped to a SOM network. This has a pragmatic value of representing complex data.

The basic goal of the self-organizing maps is to convert high dimensional data into low dimension map usually 1 or 2 dimensions which plot the similarities of the data by grouping similar data items together. So SOMs accomplish two things, they reduce dimensions and display similarities. SOMs can be used in two principal ways, one as a cluster generator and other as a classifier. It is based on competitive learning, where the output nodes compete among themselves to be the winning node (or neuron), the only node to be activated by a particular input observation. Thus, SOMs are nicely appropriate for cluster analysis, where underlying hidden patterns among records and fields are sought. SOMs structure the output nodes into clusters of nodes, where nodes in closer proximity are more similar to each other than to other nodes that are farther apart.

3.3.2.1 Structure of Self Organizing Maps (SOMs):

Figure 3.1, below, represents a typical SOM architecture. The input layer is shown at the bottom of the figure, with one input node for each field. Just as with neural networks, these input nodes do no processing themselves but simply pass the field input values along downstream SOM networks are feed forward and completely connected. Feed forward networks do not allow looping or cycling. The network is completely connected to every node in a given layer to every node in the next layer. Similar to neural networks, each connection between nodes has association with it, which at initialization is assigned randomly to a value between zero and one.
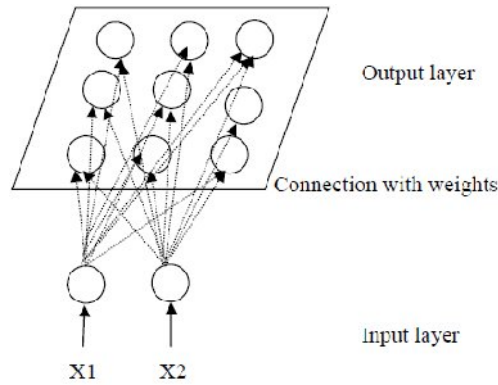
Fig. 3.1: SOM Architecture

Adjusting these weights represent the key for the learning mechanism in both neural networks and SOM. Variable values need to be normalized or standardized, just for neural networks, so that certain variables do not overwhelm others in the learning algorithm.

Unlike most neural network models, SOM networks have no hidden layer. The data from the input layer is passed along directly to the output layer. The output layer is represented in the form of a lattice, usually in one or two dimension, and typically in the shape of a rectangle, although other shapes such as hexagons may be used. The output layer shows in figure 1 is a 3x3 square. Finally, SOM exhibit three characteristic processes which is

    a. Competition
    b. Cooperation
    c. Adaptation.

a. Competition:

The output nodes compete with each other to produce the best value for a particular scoring function, most commonly the Euclidean distance. In this case, the output node that has smallest Euclidean distance between the field inputs and the connection weights would be declared the winner.

b. Corporative:

The winning node therefore becomes the centre of a neighborhood of excited neurons. This emulates the behavior of human neurons, which are sensitive to the output of other neurons in their immediate neighborhood. In SOMs, all the nodes in the neighborhood share the adaptation given by the winning nodes. They tend to share common features, due to neighborliness parameter, even though the nodes in the output layer are not connected directly.

c. Adoption:

In the learning process, the nodes in the neighborhood of the winning node participate in adaptation. The weights of these nodes are adjusted so as to further improve in the score function. For a similar set of field values, these nodes will thereby have an increased chance of winning the competition once again.

4. RESULT AND DISCUSSION

4.1 Multiple Correspondence Analyses:

Multiple Correspondence Analysis is used to check association between more than two variables. Results are as follows:

Analytical skills, quizzes are helpful in academic achievements, attendance percentages and interaction or consultation with instructor.

Table 1 shows the value of inertia. The proportion of inertia value accounted for dimension 1 is .448 showing that the dimension 1 can explain the association of the variables 45%. And the proportion of inertia value accounted for dimension 2 is .432 showing that the dimension 2 can explain the association of the variables 43%. It indicates near about 90 % variation explains by two dimensions.

According to figure 1 we conclude that the students whose attendance is 96 to 100% have excellent analytical skills and according to these students quizzes are always help in academic achievements and also have daily interaction with instructor. These 4 variables are associated with each other and it indicates that these variables are jointly effected dependent variable, CGPA. More Information that we obtain from this figure, students whose attendance is 75 to 80% and 86 to 90% have good analytical skills and have often interaction with instructor. According to these students quizzes are usually helpful in academic achievements. So these categories of 4 variables are associated with each other and jointly effected dependent variable (CGPA). Students whose attendance is 81 to 85% have just ok analytical skills. Hence from these results we conclude that 4 variables (analytical skills, attendance percentage, interaction and quizzes) that we include in this analysis are associated with dependent variable (CGPA).

Table 2 indicates the discrimination measures of all variables that we use in this analysis. Mean value of attendance is .52, interaction with instructor is .47, mean value of quizzes is .27 and the mean value of analytical skills is .51.

Discrimination measure is the variance of the quantified variable in that dimension. Large discrimination measures correspond to a large spread among the categories of the variable and, consequently, indicate a high degree of discrimination between the categories of a variable along that dimension. The average of the discrimination measures for any dimension equals the percentage of variance accounted for that dimension. Consequently, the dimensions are ordered according to average discrimination. The second dimension has the largest average discrimination and the first dimension has the second largest average discrimination. As noted in figure 2 on the object scores plot, the discrimination measures plot shows that the first dimension is related to variables quizzes and interaction with instructor. These variables have large discrimination measures on the first dimension and small discrimination measures on the second dimension. Thus, for both of these variables, the categories are spread far apart along the first dimension only. Analytical skills and attendance percentage have large values on the second dimension but a small value on the first dimension.

4.2 Self Organizing Feature Maps:

Self-Organizing Feature Maps (SOM) is type of neural network from the family of unsupervised learning. It is very useful for groping the high dimensional data, based on competitive network. This is applied to extract the natural grouping in the data. Here SOM is utilized to make the clusters of the respondents with respect to "At Risk" and "Not At Risk". Seven factors are used for this purpose that are CGPA at the end of second semester, Home Environment, Learning Skills, Hard Working, Academic Interaction, Study Habits and Study Time.

Figure 3 shows the iterative training graph during the training in progress. As during this training the training error is decreased and having value less than 0.3. The training is performed in two phase. At first phase the value of the learning rate is set to 0.1 that will decrease to 0.02 and the neighborhood is set at 3 that also decrease to 1. In the second phase learning rate is decreased to 0.01 and neighborhood is set to zero. An attractive feature of the SOM is the topological Map presented in the figure 4. In it the output layer neurons are arranged on a two dimensional lattice, and the Kohonen training algorithm is designed to encourage the formation of clusters of similar cases at nearby positions in the lattice. Class labels are assigned to neurons on the bases of the output variable that is provided to the network.

For each neuron in the topological map, number of cases in it and its label is given. For example first neuron has 17 students and they all are "At Risk". As the label is assigned to the neuron on the bases of that assigned the name bad governance if at least 70% respondents in this neuron are "At Risk". Two neurons are left unknown with 9 in 1st and 7 in 9th countries in it because an ambiguity is creating in it and 70% of these respondents is cannot find. Further the neurons that have blacker colour have the less activation value. A case is assigned to that neuron that has less value of activation. Here the less value of the activation is for second neuron so first case is assign to it. From the topology, the neurons which have label "R" is make one cluster and the neurons that have label "NR" is make another cluster. The figure 3 is an illustration of the network, light colour of a neuron represents the less activation.

A model summary of the network is also reported in table 3 in it training (0.881119), selection (0.768116) and test (0.797101) performance have the reasonable values and training (0.267085), selection (0.376823) and test (0.446930) error also representing less values of error. This report that overall network's performance is good. To identify the most important variable that contributes more in this network sensitivity analysis is performed. The sensitivity analysis is given in table 4. In this table ratio and rank for each variable is appears. Ranks to the variables are assigned on the bases of ratio, that variable which have highest value of ratio will receive the rank one and identify as the most contributive variable. Here factor Hard Working has the large value of the ratio and its rank is one. So it is the most important variable. The next contributive variables are Learning Skills, CGPA, Study Time, Academic Interaction, Home Environment and Study Habits. As, if output variable is provided to the network than it perform two task clustering and classification.

So the classification table 5 is available which shows that from total of 300 respondents 180 students are "Not At Risk" and 54 are "At Risk". Out of 199 respondents

180 are correctly classified from the remaining respondents 10 are unknown and 9 is wrongly classified. Same from the 82 respondents 54 are assigned to "At Risk" cluster and 6 countries are remain unknown. So percentage of correct predication for "Not At Risk" is 90.45% and for "At Risk" 65.85%. Measures of classification in this table signify that categorization is done in a good manner by the network. Confusion matrix in table 6 is also representing the same situation that is defined above. From the sensitive analysis it is revealed that hard working have more contribution in the network and in the formation of the clusters. The next contributive variables are Learning Skills and CGPA

5. CONCLUSION

We conclude that the students who usually involve in Group discussion have excellent analytical skills and who always involve in group discussion have good analytical skills. Students who always attend seminars have very good analytical skills and communication skills. Students who never attend seminars have average analytical and communication skills. We conclude that students who always ask questions in class for clarity of concepts deeply have excellent presentation skills and they always study material other than course contents. We also find that students who have excellent analytical skills belong to the fifth response category (96 to 100%) of attendance percentage. For these students quizzes are always helpful in academic achievements and they have daily interaction with instructors. Students regularly consult their study work with teachers. Further Hardworking, Learning skills and CGPA are playing important role in classifying the students into categories of at risk and not at risk. Next important factors are Study Time, Academic Interaction, Home Environment and Study Habits. Finally results of this study shows the importance of evaluating factors such as, Learning skills, Study style, and interaction with instructor group discussion. Specifically, learning skills is important factor associated with academic achievements.

6. APPENDIX

Table 1: Model Summary

Dimension	Cronbach's Alpha	Variance Accounted For		
		Total (Eigenvalue)	Inertia	% of Variance
1	.590	1.793	.448	44.830
2	.562	1.729	.432	43.230
Total		3.522	.881	
Mean	.576(a)	1.761	.440	44.030

Joint Plot of Category Points
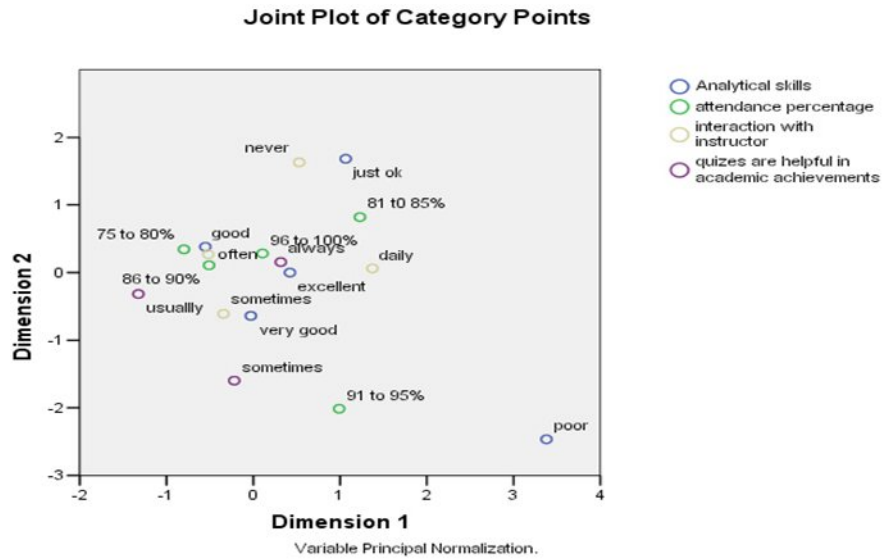
Fig. 1: Joint Plot of Category Points

Table 2: Discriminations Measure

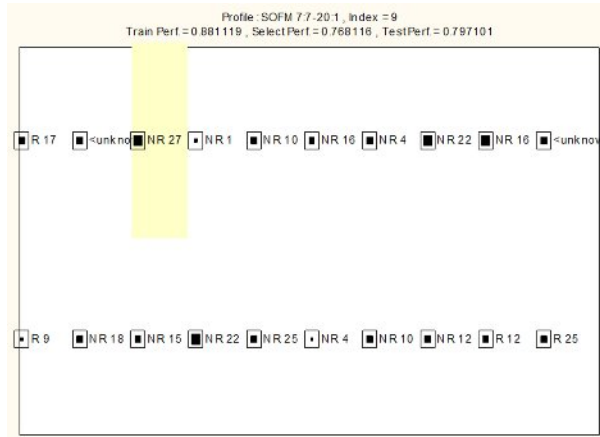|	Dimension		Mean
	1	2	
attendance percentage	.435	.595	.515
interaction with instructor	.498	.445	.472
quizzes are helpful in academic achievements	.396	.139	.268
Analytical skills	.464	.551	.507
Active Total	1.793	1.729	1.761
% of Variance	44.830	43.230	44.030
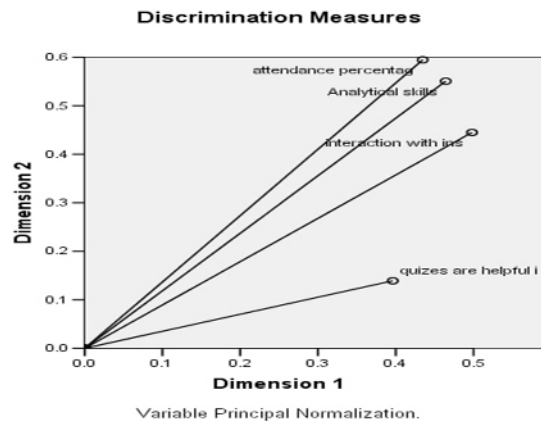
Fig. 2: Discrimination Measures
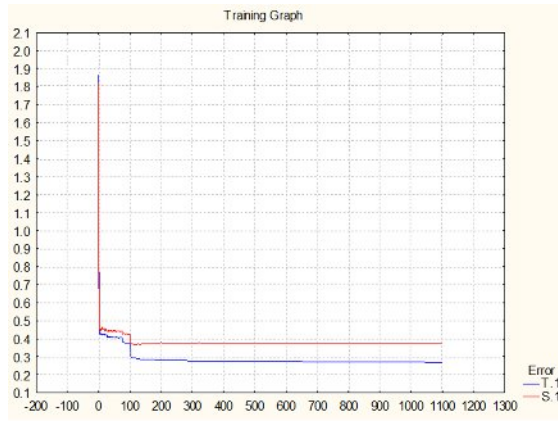
Fig. 3: Iterative Training Graph

R = At Risk,   NR = Not At Risk

Fig. 4: Topology
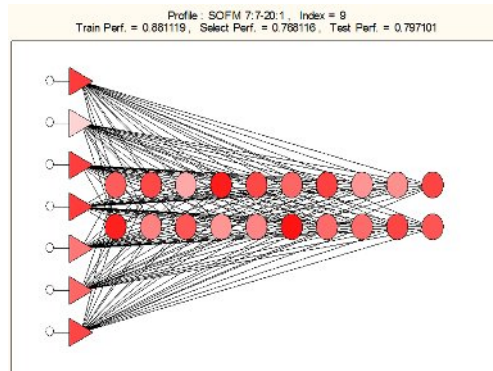
Fig. 5: Network Illustration

Table 3: Model Summary Reports

Profile	SOFM 7:7-20:1
Train Performance	0.881119
Select Performance	0.768116
Test Performance	0.797101
Train Error	0.267085
Select Error	0.376823
Test Error	0.446930
Training/Members	KO1000
Inputs	7

Table 4: Sensitivity Analysis:

Variables	Ratio	Rank
CGPA	0.989375	3
Study Time	0.982569	4
Home Environment	0.967982	6
Study Habits	0.897931	7
Learning Skills	1.000013	2
Hard Working	1.030279	1
Academic Interaction	0.982441	5

Table 5: Classifications

	Not At Risk	At Risk
Total	199	82
Correct	180	54
Wrong	9	22
Unknown	10	6
Correct (%)	90.4523	65.85366
Wrong (%)	4.5226	26.82927
Unknown (%)	5.0251	7.31707

Table 6: Confusion Matrix

	Not At Risk	At Risk	Total
Not At Risk	180	22	116
At Risk	9	54	87
Total	117	86	203

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