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Editorial Note

In the last issue of South Asian Journal of Management Research, in the editorial note I mentioned about humor. Humor can increase the happiness and reduce the stress.

Stress is most vulnerable condition in the organization because experts as well as non-experts are handling the stress situation of the employees. Some scientists still argue that they know little about stress whereas many people claim that they know everything about stress. And the result is handling the stress improperly.

Job stress has several impacts on individual employee and organization. Most of the employees in modern organization experience stress. It can have a damaging effect on employee, especially managers. It can affect the effectiveness of the organization as well as employees. The problem of stress is very much relevant of change that is spreading across the globe in all the fields. The employees are unable to cope of with changes. Organizations are doing little to handle the change process. For any organizational process the change must be helping the employees in improving the ability of organization to cope up with the change in its environment.

Lazarus's view on stress is that an individual perception of the psychological situation is the critical factors for stress. It includes potential harms, threats, and challenges on one hand, and on another an individuals ability to cope with them. The ability or inability to cope with stress is the perceived ability of an individual. Coping strategy differs from individual to individual in a different manner.

Less research is available on coping strategies of stress. Readers can contribute research articles on coping strategies of stress.

Dr. Babu Thomas
Editor

Personality Mapping: Tool to Understand Interpersonal need and Enhance Performance

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Abstract: The personality of an individual is a clue to his interpersonal needs. Identifying the type of personality might help organizations to map their employees' needs. This is a well known fact that every individual have different needs and if they are fulfilled, he is motivated enough to perform. The sample of the study is the future workforce i.e. students pursuing business management course. The study reveals that there is close relationship between personality & interpersonal needs.

Keywords: Personality Mapping, Neuroticism, extraversion, interpersonal needs, agreeableness, conscientiousness.

1. Introduction

Human being is highly social in his behavior. He interacts with people around him in a wide variety of ways, ranging from just being together to most intimate forms of socializing. People seek company to avoid being alone, to confabulate, to ask for as well as to offer help, to accomplish common goals, to share joys and sorrows, to listen and to be listened to, to show or to be shown the way, to show off, compete or fight with one another, etc. These interactions are referred to as interpersonal (between persons) behavior. Due to this interpersonal behavior arise the interpersonal needs i.e. what does one expect from others or from oneself?

The personality of an individual is a clue to his interpersonal needs. Identifying the type of personality might help organizations to map their employees' needs. This is a well known fact that every individual have different needs and if they are fulfilled, he is motivated enough to perform. The sample of the study is the future workforce i.e. students pursuing business management course. The study reveals that there is close relationship between personality & interpersonal needs.

Many empirical studies have investigated the relations between Interpersonal needs and the Big Five personality factors. Measures include the Big Five Inventory (BFI: Benet-Martinez & John, 1998; John, Donahue, & Kentle, 1991) and FIRO-B. In a study of personality and interpersonal resources, a total of 399 students pursuing MBA, have completed the Big Five Inventory, a personality measure, and the FIRO-B, a measure of interpersonal resources. Sayles (1964) suggests that administration involves virtually constant contact with people , and managers whose personalities do not dispose them toward a high amount of interpersonal activity are likely to be frustrated and dissatisfied. Thus it seems appropriate to examine the interpersonal needs of potential managers i.e. Management students.

2. Literature review

The paper entitled "Psychometric Correlates of FIRO-B Scores: Locating the FIRO-B scores in personality factor space" by Furnham, Adrian investigated the relationship between the six Fundamental Interpersonal Relations Orientation (FIRO)-B scales, the Big Five Personality traits assessed by the NEO PI-R, the Hogan Development Survey (HDS) and two measures of cognitive ability (Watson Glaser; Graduate and Managerial Assessment). It studied the concurrent and construct validity of the measure in various adult groups attending assessment centres in order to locate the FIRO-B dimensions in established personality factor space. The FIRO-B was consistently correlated with Extraversion, though analysis at the primary factor level reflects many traits from all

five factors were strongly correlated with the six FIRO-B scores. The regression of the six FIRO-B facets onto each of the Big Five shows that all are significant particularly for Expressed Inclusion and Wanted Control. The second study also showed considerable and logical overlap between the six FIRO-B scales and the 11 dysfunctional personality strategies as measured by the HDS.

The study entitled "Interpersonal needs & vocational specialization among female business students" was conducted by Raymond E. Hill. This study examined interpersonal needs as measured by the FIRO-B instrument in relation to choice of functional specialty among a sample of female business students. The results indicated a significant relationship between total need for interpersonal interaction and choice of specialty, with personnel majors preferring more active interpersonal relations and finance majors preferring less active, more distant personal relations.

Another study titled "Relationships between Interpersonal needs & preference for a functional area of management among MBA students" was conducted by Raymond E. Hill. This study also examined interpersonal needs as measured by the FIRO-B instrument in relation to choice of functional specialty among a sample of first year MBA students. The research shows that the most influential dimensions are the needs related to affection & inclusion. The need for control is not related to preference for functional areas.

Sullivan (1953) redefined personality itself as an interpersonal phenomenon. He viewed "personality" as a relatively stable pattern of interpersonal behaviors arising from interactions with others, especially during critical developmental periods. Sullivan argued that interpersonal skills and the sense of identity can develop from human interactions. He asserted that interpersonal skills arise from individuals' reactions to an innate drive to reduce anxiety. This global, undifferentiated drive becomes transformed through maturity and experience to become more focused as differentiated needs for security and satisfaction. Empathy is a central component of socialization, as a skill for evaluating others' needs and abilities. An individual who fails to master the distinctions among social identity, power, and love is at substantial risk for the development of pathological relationships.

As fields of research, personality (with its intrapersonal emphasis), and interpersonal relations (emphasizing dimensions of interaction among individuals) are both maturing as alternative, yet complimentary, foci of individual differences. Personality, from the purely psychometric view of factor models, has tended to focus on a small number of predispositions, resulting in the increasingly prominent Five Factor Model (FFM; Costa & McRae, 1985; 1992; Wiggins, 1996). This perspective views the internal, more-or-less stable behavioral predispositions, as orthogonal dimensions of personality which have been labeled Extraversion, Neuroticism, Agreeableness, Conscientiousness, and Openness. The Big Five model was the basis for Basic Factors Inventory (John & Srivastva, 1999), a 44-item measure of extraversion, neuroticism, agreeableness, conscientiousness, and openness. The model has not only achieved a certain bedrock status by its scope and apparent robustness, but has the virtue of substantive convergent support from lexical, symbolic-interactionist and dyadic-interactional perspectives, each lending individual support to, and ultimately mutually validating, the factors (Wiggins, 1996).

The measurement of interpersonal constructs presents a more intricate problem. The assessment of interpersonal behaviors is more complex than that of personality. For most purposes, the personality is conceived as static--a person is more or less the same as he or she was yesterday, and will presumably be very similar to his or her personality tomorrow. Measurement of interpersonal behavior requires that the person be viewed as interacting in a number of different situations. Insight into this perspective was provided by early analyses of group behavior (Lewin, 1947), in which it was argued that there are dimensions of interpersonal behavior that cannot be predicted by personality measures alone. This argument was further supported by Cattell (1948), who asserted that there was an interpersonal component of "syntality" that arose from interpersonal interaction. Syntality could not be

predicted directly from measured personality traits. Instead, it was a distinct and relationship-specific phenomenon.

While researchers such as Leary (1957) and Kiesler (1996) have tended to focus on two-dimensional interpersonal models, there remains the issue of the minimum number of dimensions that actually exist. There is general agreement that the dimension of Dominance-Submissiveness is well established. However, there is considerable disagreement as to the components of positive and negative emotional aspects of interaction, since it is possible to interpret the dimension of positive and negative interactions as reflecting the existence of an additional component. Schutz (1958) advanced the Fundamental Interpersonal Relations Orientation (FIRO) system. Schutz posited the existence of three basic dimensions of behavior. "Control" reflects the person's dominance in the interaction--an individual elevated in Control tends to direct, lead, or manipulates the relationship; those persons low in Control tend to emit patterns of behavior that facilitate others to initiate dominance. Schutz made a critical distinction between two components of interaction involving the definition of an individual's role in a relationship. "Inclusion" addresses the issue of personal significance in an interaction. A person elevated in inclusion is recognized as positively or negatively significant in an interaction. The third dimension is "Affection," a measure of the positive or negative emotional aspects of a relationship. Individuals elevated in Affection are emotionally bound to the relationship; those low in affection have little emotional investment in the relationship.

Schutz (1958) defined each of these three relational components as having two distinct tactical operations. Each aspect has an "Expressed" component and a "Wanted" component. Inclusion Expressed (IE) behaviors signify a desire to be a member of a relationship. Inclusion Wanted (IW) behaviors are internal desires to be included by another. If the person is socially competent, he or she will manifest appropriate matches in Expressed and Wanted aspects. Problems arise, however, for the individual who lacks the interpersonal skills to match Wanted and Expressed needs. Interpersonal incompetence arises from a disjunction in the level of expression versus wanting of a component.

The literature is mixed regarding evidence for the tripartite distinction posited by Schutz (1958). The three-dimensional model was developed by a careful analysis of self-reports. However, other researchers have failed to support a distinction between Inclusion and Affection (Gough & Bradley, 1996). This issue is further complicated by the subtleties inherent in assessment; indeed, a major paper argues that the failure to cross-validate personality or interpersonal measures founders on the actual structure of the language itself (Hofstead, DeRaad & Goldberg, 1992). Thus, the direct comparison of dimensions across linguistic communities presents problems.

The current study was conducted to explore the relationship between two established models of individual differences. The personality-within model was represented by the Big Five measure; the personality-between models was represented by the FIRO-B model. It was hypothesized that the two approaches would have common variance in some areas, but that unique dimensions of behavior would emerge for each measure.

3. METHODOLOGY

The study has been undertaken to find out the relation between personality & the interpersonal needs.

4. Objective

The objective of the research is to analyze the impact of personality traits on the interpersonal needs and hence coining the term "Personality Mapping" as the tool to analyze these needs.

5. Participants

The participants of the study were of MBA students. 274 male and 125 female students were considered for the present study. Out of these 236 belong to, general category and 163 to reserved category. The sample distribution as per area of specialization is as follows: Finance specialization 199, marketing specialization 133& Human resource specialization 67.

6. Materials

6.1 BIG FIVE

The Big Five Inventory consists of 44 items aggregately measuring five independent dimensions. Extraversion has 8 items, of which 3 are reverse-scored. Agreeableness and Conscientiousness are each represented by 9 items, including 4 reversals, for each scale. Neuroticism has 8 items, with 3 reversals; Openness has 10 items, 2 reversed.

The five factor model of personality focuses upon those behaviors that one expresses while dealing with people, changing circumstances and the environment. The two remaining behavioral dimensions relate to work and depression situations. The five big personality tests measure intensity of one's behaviors in these five areas.

6.1.1 Factor 1: Agreeableness (A)

How does one react to others' opinions? When you agree to them easily, you are considered agreeable. However, your strong reactions qualify you as challenger in the words of Howard and Howard (2001).

6.1.1.2 A Higher Degree in 'A'

The five factor model of personality considers one as good natured, sympathetic and forgiving, tolerant, agreeable and courteous. They prove to be an excellent team member. They strive to bring harmony amongst their mates. They are friendlier, approachable and appeasing. They can ignore their own needs for others'.

6.1.1.3 A Lower Degree in 'A'

Five factor model of personality considers them as critical, analytical and tough. They are expressive in their opinions. They don't hide their reactions. They want their efforts and achievements to be acknowledged. They can challenge & are born leader.

6.1.2 Factor 2: Openness to Change (O)

Five factor model of personality considers one open for change when one accepts new thoughts, ideas and changes.

However, one is considered close to change when one avoids new experiments and follows rules and regulations very strictly.

6.1.2.1 A Higher Degree in 'O'

The person high on this variable is considered as original, creative and curious. For them change is more than essential for social evolution & hence they love revolutions. They enjoy complexities of things and strive to find out the solutions. They can handle new systems, technologies and tools with great ease.

6.1.2.2 A Lower Degree in 'O'

They are resistant to change and traditional. They love peaceful environment, secure jobs and serene family life. They spend a lot of time on details and can execute plans very well.

6.1.3 Factor 3: Extraversion (E)

Five factor model of personality considers that their preferred way to handle their environment is very important.

6.1.3.1 A Higher Degree in 'E'

They are social, friendlier and talkative, often assertive and energetic. They are charismatic & prefer to lead others.

6.1.3.2 A Lower Degree in 'E'

They are considered private, serious, quiet and skeptic and don't rely on others easily.

6.1.4 Factor 4: Conscientiousness (C)

How do you take your work?

6.1.4.1 A Higher Degree in 'C'

As per the five factors model of personality they are considered as an organized, focused and timely achiever of their goals. They tend to be workaholic and are self-disciplined, confident, dutiful and reliable.

6.1.4.2 A Lower Degree in 'C'

They are careless, relaxed and unorganized. They don't plan things and pursue their goals with a flexible approach.

6.1.5 Factor 5: Neuroticism (N)

How do you handle depression?

6.1.5.1 A Higher Degree in 'N'

The five factor model considers such people as nervous, unstable and vulnerable to negative emotionality. They are never satisfied with their life. They are reactive and often fail to recover from depression shock easily.

6.1.5.2 A Lower Degree in 'N'

They are emotionally stable, strong nerved and composed person. They are often calm and optimist.

7. FIRO-B

The FIRO-B is a 54-item instrument that measures six dimensions of an individual's behavior toward others: (a) Expressed Inclusion (eI), (b) Expressed Control (eC), (c) Expressed Affection (eA), (d) Wanted Inclusion (wI), (e) Wanted Control (wC), and (f) Wanted Affection (wA). This instrument can be self-administered and also requires approximately 15 to 20 minutes to complete. Schutz (1967) originally developed the tool in the late 1950s to predict how military personnel would work together in groups. He first described his creation in his book, *FIRO: A Three-Dimensional Theory of Interpersonal Behavior* (Schutz,1958). Ideas from the works of three distinguished psychologists—T. W. Adorno, Erich Fromm, and Wilfred Bion—are incorporated in the theory that underlies the FIRO-B (Schnell & Hammer, 1993, 2004).

Based on a simple model, the FIRO-B proposes that individuals are motivated by three interpersonal needs:

1. *Inclusion (I)*: a need to maintain relationships with others, to be included in their activities, or to include them in the activities of the individual.
2. *Control (C):* a need to maintain a balance of power and influence in relationships.
3. *Affection (A)*: a need to form personal alliances with others (Schnell & Hammer,1993, 2004).

Additionally, Schutz (1978) proposed that two dimensions of each need can be identified:

(a) The extent to which individuals are likely to *express* the associated interpersonal behaviors toward others and (b) the extent to which individuals *want* to receive those same interpersonal behaviors from others (Hammer & Schnell, 2000). The interactions between interpersonal needs and *expressed* and *wanted* behaviors form the six subscales (Schutz, 1978) that are measured from the individual's responses to each of the included statements. A client's responses to the FIRO-B yields 12 scores that are examined when interpreting the FIRO-B profile:

- Six individual "cell" scores.
- One Overall Need score.
- Two Total Behavior scores.
- Three Total Need scores (Hammer & Schnell, 2000).

The individual's scores are aggregated across the rows to obtain Total Expressed Behavior and Total Wanted Behavior scores, down each column for the Total Need scores, and over all of the individual cells to provide an Overall Need score (Schnell & Hammer, 1993, 2004). Scores in the six individual cells are estimates of "how much" each of the interpersonal dimensions is characteristic of the test-taker (Schnell & Hammer, 1993, 2004).

The general interpretation of the FIRO-B *individual* cell scores is as follows (Schnell & Hammer, 1993, 2004):

- *0 to 2 (Low):* the behaviors are not characteristic of the test-taker.
- *3 to 6 (Medium):* the behaviors are periodically a noticeable characteristic.
- *7 to 9 (High):* the behaviors are frequently a noticeable characteristic of the test-taker.

The Overall Need score (Overall Need = eI + wI+ eC+ wC+ eA + wA) represents the overall strength of an individual's interpersonal needs (Hammer & Schnell, 2000). It shows how much a person believes that other people and intimate interaction can be a source of goal attainment and personal achievement (Schnell & Hammer, 1993, 2004). Higher scores indicate that a person is extensively involved with others, whereas lower scores indicate less interpersonal liaisons (Schnell & Hammer, 1993, 2004). The scores are generally interpreted as follows (Hammer & Schnell, 2000):

- *0 to 15 (Low)*: Interactions with others are minimal sources of need satisfaction.
- *16 to 26 (Medium–Low)*: Once in a while interactions with others are sources of satisfaction.
- *27 to 38 (Medium–High):* Interactions with others are usually sources of satisfaction.
- *39 to 54 (High):* Interactions with others are

Control, EA for Expressed Affection and WA for Wanted Affection.

7. Procedure

All items for both instruments were scored on a 5-point continuum where "1" indicated complete disagreement and "5" indicated complete agreement. Pearson correlation coefficients were computed on the combined matrix of the 6 FIRO-B and 5 BFI scales.

8. Hypothesis

1. People high on Expressed variable are extroverts. As extroverts are those who are social and talkative, it infers that they are being able to express themselves.
2. People with higher need for inclusion are agreeable. This conjecture is taken as it seems obvious that if someone works in group, he needs to be tolerant.
3. People high on Wanted variable are high on neuroticism. Those who can't express themselves but have desires and if they are not understood by others they become emotionally unstable.

9. Data Analysis

9.1 Hypothesis testing (Table 2)

1. People high on Expressed variable are extroverts.

Expressed and extraversion are positively correlated (.296). Hence, the hypothesis is accepted.

2. People with higher need for inclusion are agreeable.

The study rejects the hypothesis, as there is no significant correlation between the need for inclusion and agreeableness.

3. People high on Wanted variable are high on neuroticism.

The correlation between wanted and neuroticism is 0.212, which is significant. Hence, the hypothesis is accepted.

The other observations are: (Table 2)

- A clear pattern emerged in the relations among the FIRO scales. The correlations between the Affection and Inclusion measures were quite strong (.423). In addition, the Wanted and Expressed levels of both Affection and Inclusion were highly correlated (.377 for affection and .287 for inclusion). Thus, participants did not seem to distinguish affection from inclusion, and seemed to desire and express similar amounts of these relationship dimensions.
- EI is significantly related with WI (.371), WA(.287),extraversion(.294)Agreeableness(.155)andConscientiousness (.156).
- EC is significantly related with EA (.135), WI (.326) and WC (.112). It is negatively correlated to Agreeableness (-0.107)
- EA have positive correlations with WI (.188), WC (.273), WA (.393) and extraversion (.197)
- Expressed is positively correlated to Extraversion (.296), Conscientiousness (.139).
- WI has positive correlation with WC (.243), WA (.331). But there is no significant correlation with any of the Big 5 factors.
- WC is related to WA (.265), extraversion (.203), Agreeableness (.187) and conscientiousness (.164), neuroticism (.346), openness (.117)
- WA is related with extraversion(.213), Agreeableness (.129) and conscientiousness (.103).
- Wanted has significant correlation with extraversion (.178), Agreeableness (.129) and conscientiousness (.121), neuroticism (.212)
- Inclusion is related with extraversion (.144)
- Control has significant correlation with extraversion (.203) and conscientiousness (.150), neuroticism (.273)
- Affect have correlations with extraversion (.755), Agreeableness (.598) and conscientiousness (.659), neuroticism (.433), openness (.602)

10. Discussion

The research proves that people with need for affection are extroverts(.755), Agreeable (.598) and conscientious (.659), neurotic (.433) and

open to learn new things (.602)

The study shows that EI is significantly related with big 5 traits. People high on EI are high on extraversion (.294). This is apt as we know those who can express their need for inclusion are those who are sociable and talkative. Such people are also high on Agreeableness (.155), as to form a group or team one have to agree with other members too. EC is negatively correlated to Agreeableness (-0.107), which strengthens the argument that people who want to control others are despots, as they try to impose rather than work by consensus. The relationship between EA and WA (.393) proves the well known saying –'affection is a give & take relationship". People who can express their feelings are extroverts (.197).

Thus if one can express his need, he is high on Extraversion (.296)

The research shows that people high on WC are extroverts (.203). But this correlation is not too high, as those who want to be controlled by others can't be considered extrovert in true sense. The relation with Agreeableness (.187) seems apt as if others control you, and then you have to be agreeable. The interesting relation exists between the want for control and neuroticism (.346), which means that such people are more emotionally unstable.

Thus, if one has want but can't express, he becomes emotionally unstable but is ready to follow the rules of others.

11. Conclusion

The results of the research are similar to the earlier research as it proves that FIRO-B factors are correlated with the Big-five factors. The interpersonal needs can predict the personality of the individual. All individual have interpersonal needs but all the needs are not dominant. If the dominant need is identified, the organizations can motivate the individual by satisfying his dominant need. So, the analysis of both i.e. interpersonal needs and the personality can help the organizations to find the Person- job fit and also help them in understanding the motivational aspects of the individual.

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List of Tables

Table 1. Descriptive Statistics

	N	Mean	Std. Deviation
EI	399	5.61	2.024
EC	399	4.40	2.342
EA	399	3.75	2.242
expressed	399	13.68	4.213
WI	399	4.08	2.786
WC	399	4.53	2.482
WA	399	2.94	1.960
wanted	399	11.58	5.256
Inclusion	399	9.69	4.005
ctrl	399	8.93	3.599
affect	399	13.72	6.984
Total	399	32.38	11.434
Extro	399	21.89	9.251
Agree	399	26.69	11.061
conscient	399	25.46	10.451
Neuroticism	396	19.06	7.399
Open	396	26.85	12.686
Valid N (listwise)	396		

Table 2. Correlations

		EI	EC	EA	expressed	WI	WC	WA	wanted	inclusion	ctrl	affect	Total	Extro	Agree	conscient	Neuroticism	Open
EI	Pearson Correlation	1	.060	.062	.587 **	.371 **	.093	.287 **	.358 **	.763 **	.103 *	.425 **	.549 **	.294 **	.155 **	.156 **	-.002	.057
	Sig. (2-tailed)		.232	.219	.000	.000	.064	.000	.000	.000	.040	.000	.000	.000	.002	.002	.961	.258
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
EC	Pearson Correlation	.060	1	.135 **	.655 **	.326 **	.112 *	.023	.240 **	.257 **	.728 **	.260 **	.472 **	.097	-.107 *	.056	.056	.007
	Sig. (2-tailed)	.232		.007	.000	.000	.025	.643	.000	.000	.000	.000	.000	.054	.033	.262	.263	.892
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
EA	Pearson Correlation	.062	.135 **	1	.599 **	.188 **	.273 **	.393 **	.379 **	.162 **	.276 **	.525 **	.466 **	.197 **	.046	.089	-.046	.062
	Sig. (2-tailed)	.219	.007		.000	.000	.000	.000	.000	.001	.000	.000	.000	.000	.361	.077	.362	.215
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
expressed	Pearson Correlation	.587 **	.655 **	.599 **	1	.477 **	.257 **	.377 **	.524 **	.629 **	.604 **	.646 **	.797 **	.296 **	.024	.139 **	-.024	.046
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000	.634	.005	.628	.358
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
WI	Pearson Correlation	.371 **	.326 **	.188 **	.477 **	1	.243 **	.331 **	.778 **	.883 **	.380 **	.299 **	.609 **	-.006	-.025	.003	.043	-.080
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.899	.624	.959	.389	.110
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
WC	Pearson Correlation	.093	.112 *	.273 **	.257 **	.243 **	1	.265 **	.699 **	.216 **	.763 **	.387 **	.548 **	.203 **	.187 **	.164 **	.346 **	.117 *
	Sig. (2-tailed)	.064	.025	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000	.001	.000	.020
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
WA	Pearson Correlation	.287 **	.023	.393 **	.377 **	.331 **	.265 **	1	.670 **	.375 **	.198 **	.566 **	.533 **	.213 **	.129 **	.103 *	.058	-.001
	Sig. (2-tailed)	.000	.643	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000	.010	.039	.251	.976
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
wanted	Pearson Correlation	.358 **	.240 **	.379 **	.524 **	.778 **	.699 **	.670 **	1	.722 **	.638 **	.559 **	.789 **	.178 **	.129 **	.121 *	.212 **	.016
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.010	.015	.000	.754
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
Inclusion	Pearson Correlation	.763 **	.257 **	.162 **	.629 **	.883 **	.216 **	.375 **	.722 **	1	.316 **	.423 **	.701 **	.144 **	.061	.081	.029	-.027
	Sig. (2-tailed)	.000	.000	.001	.000	.000	.000	.000	.000		.000	.000	.000	.004	.222	.107	.566	.591
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
ctrl	Pearson Correlation	.103 *	.728 **	.276 **	.604 **	.380 **	.763 **	.198 **	.638 **	.316 **	1	.436 **	.685 **	.203 **	.059	.150 **	.273 **	.084
	Sig. (2-tailed)	.040	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.239	.003	.000	.095
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
affect	Pearson Correlation	.425 **	.260 **	.525 **	.646 **	.299 **	.387 **	.566 **	.559 **	.423 **	.436 **	1	.892 **	.755 **	.598 **	.659 **	.433 **	.602 **
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
Total	Pearson Correlation	.549 **	.472 **	.466 **	.797 **	.609 **	.548 **	.533 **	.789 **	.701 **	.685 **	.892 **	1	.570 **	.401 **	.473 **	.354 **	.379 **
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
Extro	Pearson Correlation	.294 **	.097	.197 **	.296 **	-.006	.203 **	.213 **	.178 **	.144 **	.203 **	.755 **	.570 **	1	.754 **	.822 **	.518 **	.820 **
	Sig. (2-tailed)	.000	.054	.000	.000	.899	.000	.000	.000	.004	.000	.000	.000		.000	.000	.000	.000
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
Agree	Pearson Correlation	.155 **	-.107 *	.046	.024	-.025	.187 **	.129 **	.129 **	.061	.059	.598 **	.401 **	.754 **	1	.836 **	.531 **	.832 **
	Sig. (2-tailed)	.002	.033	.361	.634	.624	.000	.010	.010	.222	.239	.000	.000	.000		.000	.000	.000
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
conscient	Pearson Correlation	.156 **	.056	.089	.139 **	.003	.164 **	.103 *	.121 *	.081	.150 **	.659 **	.473 **	.822 **	.836 **	1	.566 **	.877 **
	Sig. (2-tailed)	.002	.262	.077	.005	.959	.001	.039	.015	.107	.003	.000	.000	.000	.000		.000	.000
	N	399	399	399	399	399	399	399	399	399	399	399	399	399	399	399	396	396
Neuroticism	Pearson Correlation	-.002	.056	-.046	-.024	.043	.346 **	.058	.212 **	.029	.273 **	.433 **	.354 **	.518 **	.531 **	.566 **	1	.561 **
	Sig. (2-tailed)	.961	.263	.362	.628	.389	.000	.251	.000	.566	.000	.000	.000	.000	.000	.000		.000
	N	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396
Open	Pearson Correlation	.057	.007	.062	.046	-.080	.117 *	-.001	.016	-.027	.084	.602 **	.379 **	.820 **	.832 **	.877 **	.561 **	1
	Sig. (2-tailed)	.258	.892	.215	.358	.110	.020	.976	.754	.591	.095	.000	.000	.000	.000	.000	.000	
	N	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

EA = Expressed Affection EC = Expressed Control

EI = Expressed Inclusion WA = Wanted Affection;

WC = Wanted Control IW = Wanted Inclusion E = Extraversion;

A = Agreeableness; C = Conscientiousness; N = Neuroticism;

O = Openness

Effect of Future Trading on Spot Price Volatility for NSE Nifty using Time Series Regression and GARCH Model

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Abstract

Futures contracts detail the quality and quantity of the underlying asset; they are standardized to facilitate trading on a futures exchange. Some futures contracts may call for physical delivery of the asset, while others are settled in cash. The futures markets are characterized by the ability to use very high leverage relative to stock markets. Futures can be used either to hedge or to speculate on the price movement of the underlying asset.

The study investigated the effects of the Nifty futures on underlying the spot market volatility using GARCH (1,1) model. The research indicates that futures trading reduced stock market volatility and contributes to increase market efficiency. The study also examined futures trading changes structure of spot market volatility. There is a change in the structure of spot market volatility after introduction of futures trading. Specifically, there is evidence that the increased impact of recent news and reduced effect of the uncertainty originating from the old news. New information gets assimilated and the effect of old information on volatility gets reduced at the faster rate in the period following the onset of futures trading.

Keywords: Volatility, market efficiency, parameter, stock, garch.

1. Introduction

The stock index futures contracts were the most successful financial innovation of 1980's. The first contract was the Chicago mercantile exchange S&P 500 futures, which began trading in the US in April 1982. In India, L. C. Gupta committee on derivatives had recommended in 1998, the introduction of the index futures, followed by other instruments once the market matures. The preparation of the regulatory framework for the operation of the index futures took some time. In June 2000 futures on benchmark index were introduced and followed by options on indices, introduced in June 2001. This was again followed by options on individual stock in July 2001, and finally futures on individual stocks in November 2001.

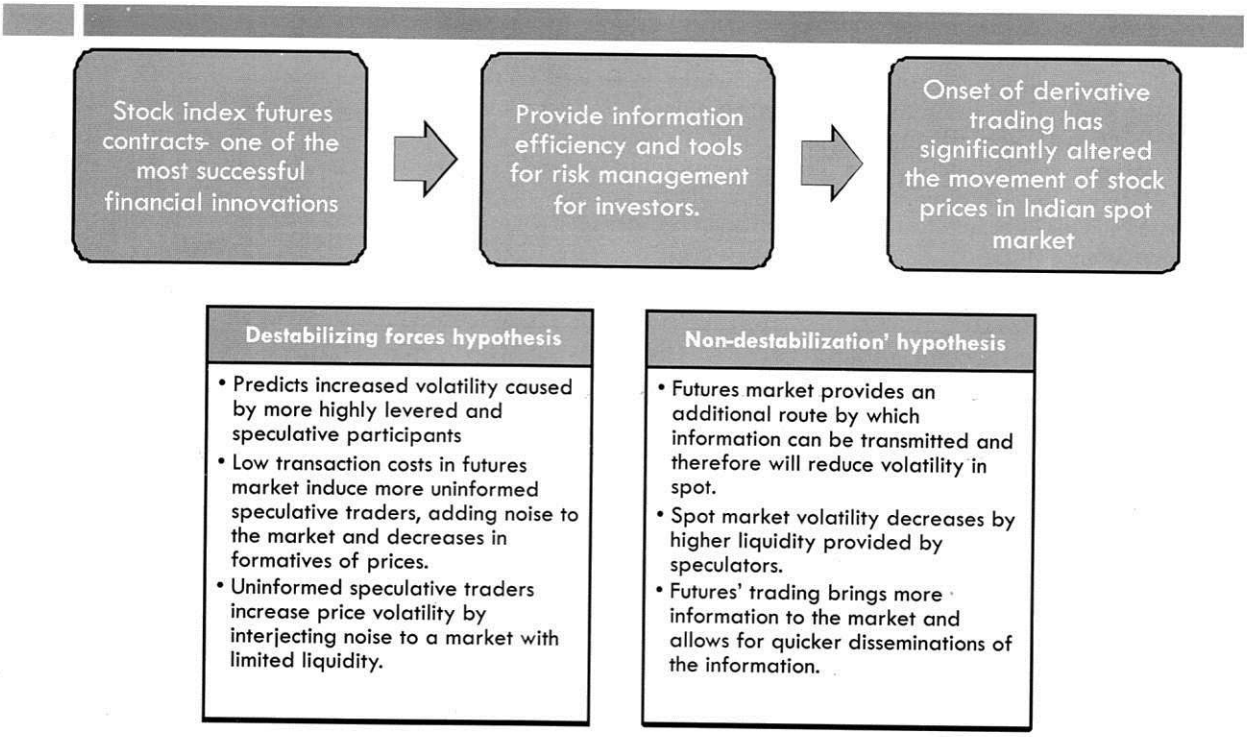
The main objectives of the introduction of the derivatives in Indian stock market is to fully integrate, the Indian financial markets with the global markets, to improve the information efficiency and to provide tools for risk management for investors.

In the late nineties, many emerging and transition economies have introduced derivative contracts, raising interesting issues unique to these markets. Emerging stock markets operate in very different economic, political, technological and social environments than markets in developed countries like the USA or the UK. The effect of the introduction of futures trading on the spot market volatility has been widely documented in the financial literature. The main objective of the study is to investigate the impact of the introduction of Futures trading on cash market volatility in an emerging capital market of India. The study uses data from a leading stock exchange in India, namely, NSE on which futures trade. The impact of futures introduction on the volatilities of the underlying stock index is examined during pre-futures and post-futures period. The Indian capital market had witnessed a major transformation and structural change from the past one decade as a result of ongoing financial sector reforms. Gupta (2002) had rightly pointed out that improving market efficiency, enhancing transparency, checking unfair trade practices and bringing the Indian capital market up to a certain international standard are some of the major objectives of these reforms.

In India, derivatives were mainly introduced with view to curb the increasing volatility of the

asset prices in financial markets and to introduce sophisticated risk management tools leading to higher returns by reducing risk and transaction costs as compared to individual financial assets. Though the onset of derivative trading has significantly altered the movement of stock prices in Indian spot market, it is yet to be proved whether the derivative products has served the purpose as claimed by the Indian regulators. Two main set of theories exist in literature about the relationship between derivatives market and underlying spot markets, with contradicting observations. These theories are: a) A 'Destabilizing forces" hypothesis that predicts increased volatility caused by more highly levered and speculative participants; and b) A 'Market completion' or 'Non-destabilization' hypothesis , that says futures market provides an additional route by which information can be transmitted and therefore will reduce volatility in spot.

Figure 1 : Explanation regarding destabilizing and Non Destabilizing



2. Literature Review

Various studies have been conducted to assess the impact of derivatives trading on the underlying market mostly related to US and other developed countries markets. Very few studies attempted to know the impact of introduction of derivatives trading in emerging market economies like India. The literature on futures markets, including financial futures, is very extensive. We review few of the important studies.

The results on the introduction of stock index futures are somewhat ambiguous. Many, authors find no significant volatility effect associated with stock index future listing. Others, including Maberly et al. (1989), Brorsen (1991), Lee and Ohk (1992), Antoniou and Holmes (1995) and Gulen and Stewart (2000) report a volatility increase in highly developed markets such as the USA, UK, and Japan. Those who argue that futures market increases stock market volatility, support this argument based on the observation that because of their high degree of leverage, futures markets are likely to attract uninformed traders. The lower level of information of futures traders with respect to cash market traders is likely to increase the asset volatility. Cox (1976), Figlewski (1984) and Stein (1987) found results supporting this in their studies. On the other hand, Antoniou et al.

(1998) and Gulen and Stewart (2000), find evidence that volatility decreased with future listings in many other countries. The opposite current of literature claims that futures markets play an important role of price discovery, and have a beneficial effect on the underlying cash markets.

According to Schwarz and Laatsch (1991), futures markets are an important means of price discovery in spot markets. Powers (1970) argued that futures markets increase the overall market depth and informativeness. Stoll and Whaley (1987) stated that futures markets enhance market efficiency. The model proposed by Danthine (1978) implies that futures trading increases market depth and reduces spot market volatility. Kyle (1985) presented alternative models asserting that futures trading lower the volatility of the underlying market. Cox (1976) and Figlewski (1984) found results that support that futures markets increase stock market volatility. The empirical evidence on the effects of futures trading on spot volatility is inconclusive. Edwards (1988b) compares estimated stock market volatility before and after the introduction of equity futures, and documents a small but statistically significant decline in volatility. By contrast, Figlewski (1984) documents a positive relation between the volatility of Government National Mortgage Association (GNMA) securities prices and open interest in GNMA futures contracts, leading him to conclude that "futures market activity increased the volatility of prices". In general, this literature provides mixed evidence as to the volatility impact of futures trading. Chang et al. (1999) analyze the effect of index future listing on the underlying stocks by decomposing portfolio volatility into the average volatility of component stocks and the cross sectional dispersion of returns. They find that when Nikkei225 futures were listed in Japan, the cross sectional dispersion of returns across stocks in the index decreased, and index volatility increased proportionally more than the average volatility of the individual stocks. No such result was found for stocks outside the index, nor was any effect found at the time of offshore listing of Nikkei225 futures in Singapore. Butterworth (2000) investigates the effect of futures trading in the FTSE Mid 250 index on the underlying spot market using symmetric and asymmetric GARCH methods. The results reported for the Mid250 index indicate that while the existence of future strading had made little impact on the underlying level of volatility, as measured by the standard deviation, it has altered significantly the structure of the spot market volatility. Pre- and post-futures sub-samples were modeled using Box-Jenkins techniques and significant parameter changes between the two periods were tested for. Results indicated that there had been no statistically significant parameter change, suggesting that spot volatility had not been influenced by the introduction of futures trading.

In the Indian scenario, we have the few related empirical works. Shenba garaman (2003) examined the impact of introduction of NSE Nifty index futures on Nifty index. Using an event study over the period from October 1995 to December 2002, she tested for change since the volatility before and after the introduction using GARCH techniques to model the time series. She concluded that futures trading has not lead to a change in the volatility of the underlying stock index but the structure of volatility seems to have changed in post-futures period. Nagraj and Kumar (2004) studied the impact of Index futures trading on spot market volatility using the data from June 12, 2000 to February 27, 2003 of S&P CNX NSE Nifty.

It also showed that domestic market factors represented by NSE 500 had a significant Spot-price effect in determining the volatility of the Nifty index but the other international factors are found to have insignificant effect. The present study covers the entire period since inception of index futures at NSE in June 2000. Pierluigi Bologna and Laura Cavallo (2002) study to analyse the effect of the introduction of stock index futures on the volatility of the Italian Stock Exchange. This study mainly addresses two issues: First, the study analyses whether the reduction of stock market volatility showed in the post-futures period, is effectively due to the introduction of futures contract. Second, whether the `futures effect', if confirmed, is immediate or delayed with respect to the moment of the futures trading onset is tested. The current study has tried to

incorporate cross sectional data and its impact on volatility post introduction of futures. But the study is limited to specific market i.e. Italy and doesn't take into account structural composition of Italian Markets.

P. Srinivasan and K. Sham Bhat (2008) try to examine the impact of futures trading on spot market volatility of selected commercial banks in India. The study considered the daily closing price returns of twenty-one selected commercial banking stocks in India. Out of 21 banking stocks, 13 belong to public sector while 8 belong to private sector. The empirical analysis of selected banking stocks was conducted for the different time periods from 1st January, 1996 through 29th May, 2008.

Sibani Prasad Sarangi & Uma Shankar Patnaik (2007) paper focuses on the volatile behaviour in the equity market in individual stocks after the introduction of futures trading on individual stocks. The paper examines the stock market volatility of individual stocks listed on the S&P CNX Nifty index after the introduction of futures trading. It uses the family of GARCH techniques to capture the time-varying nature of volatility and volatility clustering phenomenon in the data. The data consist of daily closing price returns of 28 individual stocks listed on S&P CNX Nifty, Nifty Junior index and S&P index. The study spanned from October 4, 1995 to March 31, 2007. The total number of observations is 2,878 for the stocks where futures trading were introduced from the inception. The largest possible dataset was used for the study.

Pretimaya Samanta & Pradeepta Kumar Samanta (2007) in their study assess the impact of introducing index futures and stock futures on the volatility of the underlying spot market in India. The research paper uses the standard univariate GARCH model to capture the time-varying nature of volatility and volatility clustering phenomenon in the data. The sample data consists of daily closing price returns of S&P CNX Nifty, Nifty Junior, and S&P 500 index from October 4, 1995 to December 31, 2006.

Satya Swarup Debashish(2008) emphasis that futures trading affects the volatility and operating efficiency of the underlying Indian stock market by taking a sample of 15 individual stocks. The study examines the effect of introduction of futures trading on the stability of BSE Sensex. It also aimed to measure the conditional volatilities of daily returns on BSE Sensex before and after futures trading. The study compared the conditional volatilities of monthly returns of BSE Sensex over pre-futures and post-futures periods, after adjusting macroeconomic factors. The study investigates whether futures trading have contributed to market crash in BSE Sensex (during May 2004 & May 2006) in the post-futures period. The useful point found in this study was the parametric and nonparametric tests conducted on the volatility of daily returns in the post futures period, was higher than in the pre futures period.

Antonios Antoniou & Andrew J. Foster (2004), empirically investigate the effects of the introduction of a futures contract for Brent Crude Oil in 1988 on the price volatility in the spot market for Brent Crude. The insignificance of the proxy variables raises questions as to the reliability of inferences made about the impact of derivative trading on volatility, since changes could be due to a number of other factors. Difficulties with filtering the effects of other determinants are, however, a common problem experienced by numerous other studies. This study, however, covers only one commodity for the UK. Further investigations using the GARCH technique to examine the experience of other commodities can be carried out.

Mr T Mallikarjunappa & Afsal E. M.(2008) attempted to analyse the impact of introduction of derivatives on spot market volatility by examining the behaviour of CNX bank Nifty Index using GRACH Models. The index comprises of 12 most actively traded stocks. The study was first subjected to stationary test. The Nifty Junior Index returns are taken as a proxy variable. This is done because it covers market wide volatility and thus serves as a perfect control factor. The GARCH (1,1) Model is run and results are analysed. The paper looks at only CNX bank ex returns. Although the bank ex contributes the most in derivative market it alone cannot be taken to study the effect on the market. The proxy to cover market wide risk is Nifty. This will introduce a bias in the process.

3. Research Methodology

3.1 Research Objectives

The primary research objective of this study is to determine the effect of future trading on spot price volatility. To achieve the said objective following secondary objectives are being studied

1. Developing models for market volatility.

2. To determine the effect of future trading on spot price volatility for NSE Nifty using time series regression and GARCH model

3. To investigate the impact of future trading on spot price volatility of individual stocks from diverse sectors of the economy.

3.2 Universe of Research

Volatility is the most common statistical measure for market movements. Volatility in prices/ markets mainly arises due to variations in demand and supply, which in turn is affected by various factors like information in the market, speculation and hedging. Hence to measure the impact of change in volatility due to futures introduction, the largest and most liquid sectors of Indian economy have been analysed. Sectoral analysis involves application of volatility models to the **most liquid** scrips of the sector. The sectors analysed are as follows:

- Banking
- Cement
- Oil and Gas
- Information Technology
- Pharma
- Infrastucture/ Real Estate

3.3 Sample of Research

A universe of 4 companies from each of the above mentioned sectors was considered for GARCH analysis. Top two companies in terms of liquidity(trading volume) and market capitalization have been taken as the sample of study. Volatility models (GARCH Models) have been applied to the sample selected. The volumes for each of the stocks chosen are as follows:

Table 1 : List of selected companies

S No	Symbol	No of Contracts	Notional Value (Rs.)
1	ICICIBANK	3663	1120425464
2	ACC	129	45257917
3	INFOSYSTCH	9471	5026661640
4	IOC	8	3155640
5	MRPL	69	26769198
6	RELIANCE	8110	2732738520
7	UNITECH	3313	1378650825
8	WIPRO	362	157150350
9	CIPLA	127	56841440

For the predictive models six sectors and 30 different companies from these sectors have been considered.

3.4 Scope of Research

The scope of the research includes the study of the stock markets prior to introduction of futures. The study also analyses the impact of futures introduction on the movements in the cash market. It aims to see the impact on cash market volatility of the futures market.

The data for the companies has been taken for the years 1995 till January 2010.

3.5 Models Used

The models used are as follows:

1. Time-series Regression
2. GARCH Models
3. Classification and Regression Trees

4. Analysis and Interpretation

This section analyses the change in volatility due to introduction of futures. This has been done for NIFTY and 9 other companies

1. Set of financial assets and datasets have time varying volatility and clustering of volatility.

4.1 Volatility clustering

- Volatility clustering is the property that there are periods of high and low (conditional or unconditional) variance. The volatility"clusters."

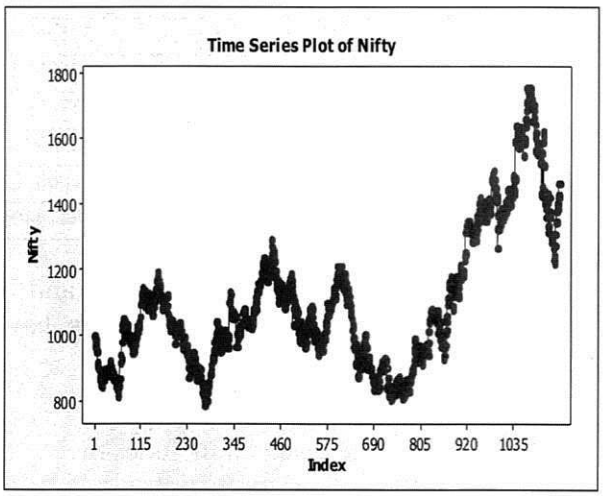
- The volatility "clusters" is a property of most heteroskedastic stochastic processes used in finance and economics.

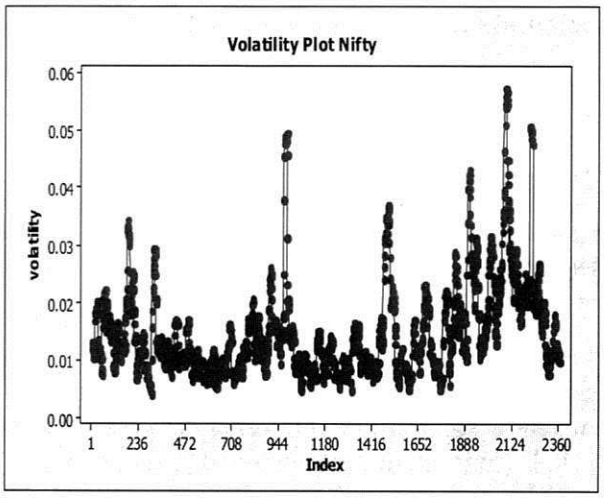
4.2 Conditional Heteroskedasticity

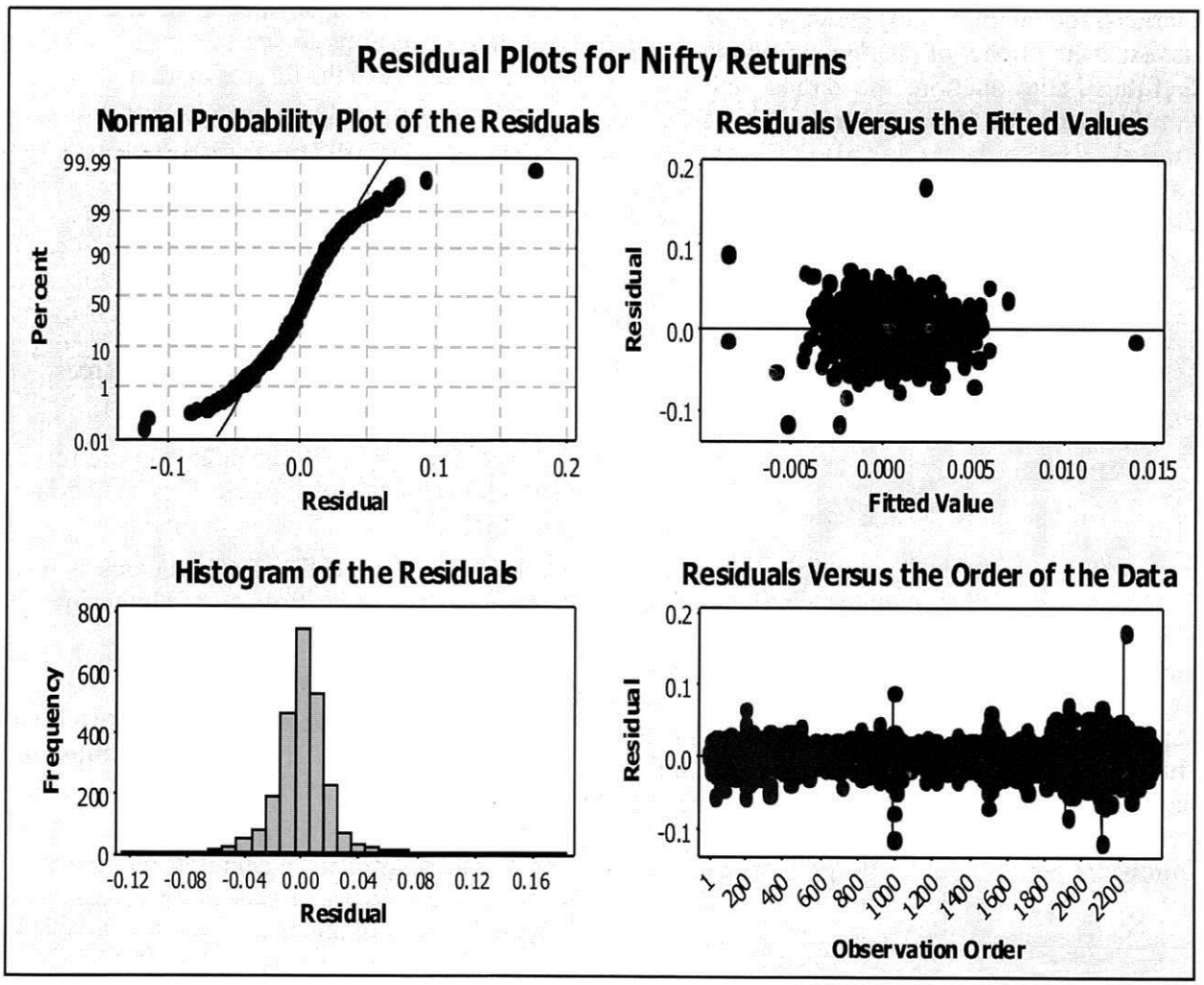
□ Variance of the current error term is a function of the actual sizes of the previous time periods' error terms.

Figure 2 (A, B, C) : Times Series and volatility Plot

NIFTY







The graph above shows volatility clustering. Also, the data is heteroscedastic. Hence GARCH model is the most appropriate for modelling the volatility of share prices. Time series regression has been carried out. The autoregressive model for the returns is as follows:

Autoregressive model for daily returns before the introduction of futures

$R(t) = 0.000491 + 0.036268 * R(t-1) + error$

Autoregressive model for daily returns before the introduction of futures

$R(t) = 0.000754 + 0.040893 * R(t-1) + error$

The model is significant at 78% confidence level. The GARCH model is applied before and after introduction of futures. The GARCH model is as follows:

GARCH Model before the introduction of futures

Standard Deviation(t) = 2.83794e-05+ 0.0727053*error(t-1) + 0.0.841998* Standard Deviation(t-1)

GARCH Model after the introduction of futures

Standard Deviation(t) = 8.65449e-06+ 0.157252*error(t-1) + 0.819833* Standard Deviation(t-1)

Hence it can be concluded that following the onset of futures trading, an increase in *alpha* suggests that news is impounded into prices more rapidly, and a decrease in *beta* would suggest that old news has a less persistent effect on prices changes. This shows that introduction of futures has led to a reduction in volatility. Similarly analysis is done for all the selected companies and the data is shown in figure 4

Table 2 : Volatility Analysis of all companies

Company	α – *Before*	α – *After*	β - Before	β – After	Volatility
Nifty	0.0727053	0.157252	0.0.841998	0.819833	Decrease
Reliance	0.12409	0.285635	0.87591	0.650168	Decrease
ICICI Bank	0.261695	0.267721	0.439776	0.692846	Increase
Unitech	0.171132	0.219205	0.719741	0.780795	Decrease
Infosys	0.235268	0.408698	0.764732	0.138205	Decrease
Cipla	0.340811	0.257166	0.659189	0.742834	Increase
Wipro	0.523105	0.593726	0.593726	0.178372	Decrease
ACC	0.125543	0.282058	0.84965	0.694559	Decrease
MRPL	0.367512	0.33650	0.656789	0.663496	No Change
IOC	0.383492	0.125435	0.448499	0.694996	Increase

Source: Primary data ; *alpha* is the coefficient of error term and *beta* is the coefficient of previous standard deviation in case of GARCH model.

4.3 PREDICTIVE MODEL:

4.3.1 Analysis Of Impact Of Various Parameters On Change In Volatility :

The diagram below shows data points used for creating a classification tree. Each data point represents a company, 30 in all from six different sectors. The six sectors are banking, IT, cement, refinery, real estate and pharma. The data has been classified into 9 sub-sections because the impact on volatility due to futures is different on different sub-sections.

The following parameters were used to determine these subsections:

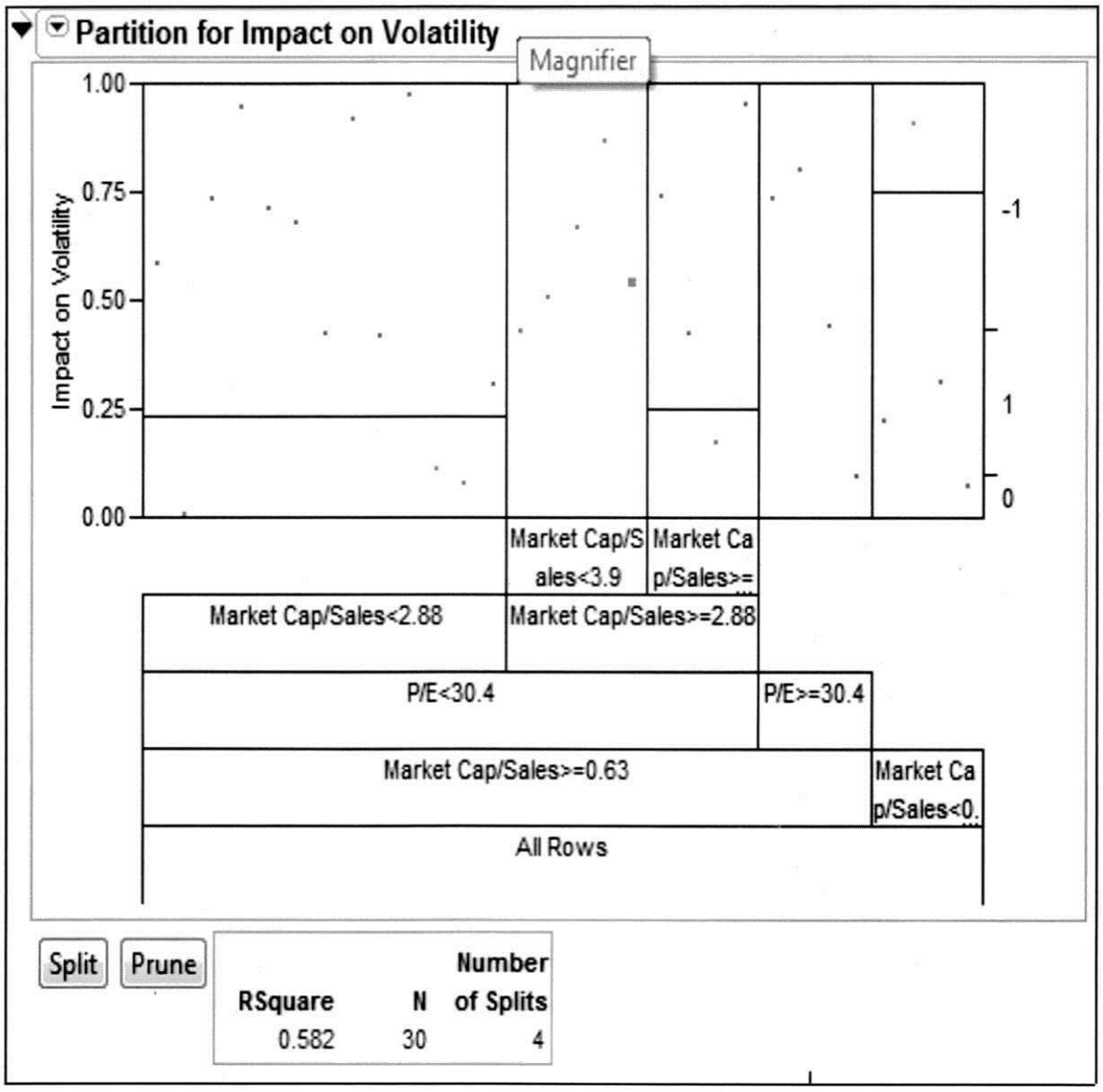
1. P/E of the company
2. Market cap to sales ratio
3. Sector of the company (Banking, IT, Cement,etc)

Methodology named CART is used to :

1. Understand the impact of significant variables
2. Create a predictive model

- CART: Classification and Regression Tree is used for discrete dependant variable, and combination of continuous and discrete independent variables

Figure: 3 Partition for Impact of Volatility

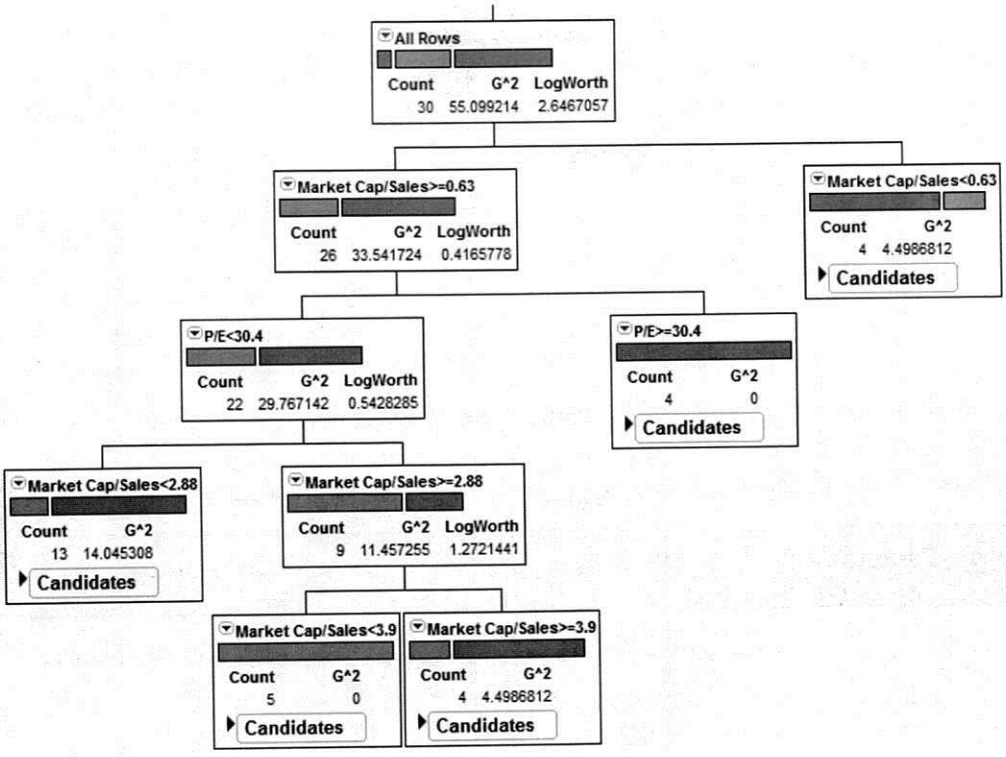


4.3.2 Classification Tree: A Predictive Model

The tree diagram below shows the criteria used to classify the companies into five sub-sections. It is observed that market cap to sales ratio and P/E are significant parameters which impact the direction and amount of change in volatility of a stock on introduction of futures.

Moreover, this classification tree acts as a predictive model that will be able to predict the impact of futures on volatility of a stock. For example, if market cap to sales ratio of a stock is less than 0.63, there is 75% probability that there will be no change in the volatility of the stock.

Figure: 4 Classification Tree : A Predictive Model



LEGEND

Red: No Change in Volatility, Green: Increase in Volatility, Blue: Decrease in Volatility.

4.4 Impact of Futures Trading on Volatility in Various Market Phases

To check impact of futures on volatility of spot stock prices and broader market, we consider one of integral part of markets i.e. different market phases. Generally it is believe that capital markets have two dominant phases viz. Bull phase and Bear phase, in between is normally efficient market.

We began our analysis by bringing forth general assumption that Bear Markets are more volatile than Bull Markets and based on this premise we divided our data into Bear and Bull phases. We did see strong signs of increase in bear market volatility post introduction of futures. The same was fairly visible in majority of the stock and the difference in pre and post future bear market beta coefficient of majority of stocks.

However there were some divergent trends where news discounting was such a big factor that volatility post introduction of futures have fallen for some stocks. Also impact on nifty is not that significant and we can not conclude that introduction of futures had led to increase in volatility during bear markets for this data set, sole reason could be higher news discounting.

4.5 Application of the model:

Classification Tree acts as a predictive model that will be able to predict the impact of futures on volatility of stock.

Example: If market cap-sales ratio of a stock is less than 0.63, there is 60% probability that volatility won't change.

Model can be extended and used by SEBI to determine whether futures should be launched for a stock or not.

4.5.1 Testing the hypothesis on different Market Phases

1. Generally it is observed that markets are more volatile during Bear Markets.

2. Our hypothesis, changes in volatility is different for market phases.

3. Bear Market – Phase of continuous negative daily cumulative returns.

4. Bull Market – Phase of continuous positive daily cumulative returns.

Nifty – Futures have resulted in lower volatility and better information discounting.

1. Nifty – Futures have resulted in lower volatility and better information discounting.

Company	Parameter	Bear		Bull	
		Before	After	Before	After
Nifty	Alpha	0.067	0.22	0.07	0.17
	Beta	0.834	0.67	0.82	0.77

On the contrary to general belief Bear markets have been less volatile

1. Reliance – Major change in Volatility post introduction of futures.

Company	Parameter	Bear		Bull	
		Before	After	Before	After
Reliance	Alpha	0.21	0.38	0.14	0.17
	Beta	0.62	0.38	0.74	0.4

Large fall in both Bear and Bull Market volatility is major reason for fall in Nifty volatility

1. ICICI – Old Index constituent have seen drastic increase in bear market volatility post introduction of futures.

Company	Parameter	Bear		Bull	
		Before	After	Before	After
ICICI	Alpha	0.36	0.11	0.248	0.37
	Beta	0.00	0.86	0.678	0.63

Increase in overall volatility can be attributed to more volatile in Bear Market

Based on the study we can make the following observations.

- Nifty volatility has been different for market phases.
- More volatile Bear Markets can be confirmed for 4 out of 7 major index constituents.
- Bear Markets are generally more volatile for majority of the stocks.
- Increased Bear Market volatility in Infosys and ACC calls for more research on impact of introduction of futures on spot market volatility.
- Increase in information discounting is fairly constant for different stocks.
- Different impact on index constituents

indicates presence of volatility levelers.

5. Conclusion and Suggestions

The study investigated the effects of the Nifty futures on underlying the spot market volatility using GARCH (1,1) model. The research indicates that futures trading reduced stock market volatility and contributes to increase market efficiency.

The study also examined futures trading changes structure spot market volatility. There is a change in the structure of spot market volatility after introduction of futures trading. Specifically, there is evidence that the increased impact of recent news and reduced effect of the uncertainty originating from the old news. New information gets assimilated and the effect of old information on volatility gets reduced at the faster rate in the period following the onset of futures trading.

The key points highlighted in the research were:

- The market capitalization and price earnings ratio are found to be significant parameters in predicting the changes in the volatility of the stocks.
- Stocks in a particular sector portray a significantly different behaviour with respect to volatility when compared to socks in other sectors.
- There is a structural difference in bear and bull market volatility. The study points to the fact that bear market volatility are higher on introduction of futures with respect to bull market.
- There is a superior discounting of information on introduction of futures.
- The dormant volatility of certain constituents has reached an average level.

6. Suggestions

- The model can be used for accurately predicting the impact of introducing futures for individual stocks. Future should be launched only if the model predicts reduced volatility.
- The model parameters need to be enhanced and additions done if required

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Impact of Irrigation on Cotton Cultivation in Kurnool District (A.P)

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Abstract:

Cotton provides livelihood to more than 60 million people in India by way of support in agriculture, processing, and use of cotton in textiles. Cotton contributes 29.8% of the Indian agricultural gross domestic product, and nearly nine million hectares of land in India is used to produce 14.2 million bales of cotton lint.

Indian cotton production is third in the world in quantity, although the productivity is substantially low. The major reason for this low productivity is damage caused by insect pests—notably *Helicoverpa armigera*, commonly referred to as American Bollworm. Nearly Rs.12 billion worth of pesticides are used in India to control just the bollworm complex of cotton. Mahyco (Maharashtra Hybrid Seed Company), in collaboration with Monsanto, has introduced Bt cotton technology into India. Bt cotton carries the *Cry1Ac* gene derived from the common soil bacterium *Bacillus thuringiensis* var. *kurstaki*, which results in the expression of the *Cry1Ac* protein that confers resistance to the bollworm complex.

Along with HYV seeds and fertilizers, water forms another important input of the package of new agriculture technology. An important source of water is rainfall. But rainfall in this country is mostly confined to a few monsoon months in a year, and there are great variations in its incidence from year to year. Moreover, rainfall in large part of the country is low and uncertain in its distribution. Even where it is high, the available soil moisture in winter and summer months is not adequate to support multiple cropping. These vagaries of weather frequently give rise to drought and scarcity. Therefore, there is an increased need for providing assured supplies of water through irrigation system.

India is known for its diversity. Irrigation is no exception to this diversity. Major, medium and minor irrigation sources constitute the main sources in India. Canals originate from major and medium irrigation projects. Tanks and wells constitute the chief source of minor irrigation. They are indigenous and traditional in India. Construction of irrigation tanks call for collective action guided by local authority. Tank irrigation system is essentially community oriented. Well also have been an important source of irrigation in India. They have been supplementing inadequate supply flows. The performance of wells irrigation varies from region to region in India. It depends upon the availability of ground water. It also depends upon other climatic and soil conditions. At the beginning, human and animal power were used to lift water from wells. Modern power driven pump sets replaced man and animal power. The technological advancement has enormously increased the performance of wells irrigation in India.

Cotton (Gossypium arboreum) is the most important fibre crop in agriculture. Most of the cotton is rainfed and only a small portion is irrigated. Andhra Pradesh is one of the southern states of India, where more than 70 per cent of the agriculture area is depending on the rainfall. The average annual rainfall in the study area is about 650 mm and 80 per cent of it is received during monsoon (July to September months). Cotton is the major crop of the area and several number of cotton ginning/spinning are located in the area. Livelihood of several people is either directly or indirectly depending on these mills. The rain fall alone is not enough to meet entire water requirement of the cotton crop. So, farmers fulfill the deficit water requirement of the cotton by irrigation. But, since last 5-10 years, the seed production profession is picking up. Unlike other general crop production, the seed production needs the special attention with respect to the irrigation and use of other inputs. The farmers have now switched from local to the hybrid varieties in almost all crops. Further, high intensive cultivation demands judicious and efficient use of available ground water. Which are nearly impossible to achieve with conventional surface-irrigation methods. The drip is one of the irrigation systems, which permits the application of optimum, frequent irrigations with relatively higher applications and distribution efficiencies.

Successful cultivation of cotton requires a long frost-free period, plenty of sunshine, and a moderate rainfall, usually from 600 to 1200 mm (24 to 48 inches). Soil usually needs to be fairly heavy, although the level of nutrients does not need to be exceptional. In general, these conditions are met within the seasonally

dry tropics and subtropics in the Northern and Southern hemispheres, but a large proportion of the cotton grown today is cultivated in areas with less rainfall that obtain the water from irrigation.

Cotton is one of the most important commercial crops in Kurnool district of Andhra Pradesh. Total area under cotton crop was 81,954 hectares in 1991-92 and it went upto to a maximum of 1, 53,708 hectares in 1998-99. But it has drastically fallen to 74,011 hectares in 2004-05.

Irrigated area under cotton crop was 10,468 hectares in 1991-92 and it went upto a maximum of 37,049 hectares in 1998-99.But it has fallen to 14,597 hectares in 2004-05.Production of cotton crop in1991-92 was 77,311 bales of 170 kgs. It reached to its maximum in the year 1995-96 to 2,17,374 bales. In 2004-05 it has come down to 1,99,830 bales.

In this district irrigation (both surface and ground water) plays a vital role in cultivation of cotton crop. More irrigated area has been brought under cotton cultivation. As farmers are moving towards Bt cotton, role of irrigation has become prominent. But statistics related to yield of cotton of this region indicate an insignificant increase.

In the present study efforts have been made to know the role of irrigation (both surface and ground water) on cotton cultivation in Kurnool district of Andhra Pradesh.

1. Literature Review

Number of studies has been carried out on the growth and instability and the relative impact of irrigation and rainfall on cotton output. Few of the recent studies are reviewed below.

Sing[1] and others investigated the relative economy and production of commercial crops like cotton, sugar cane and oil seeds in Haryana State. They estimated Cobb – Dougles production function. They observed that the inputs like fertilizers, irrigation and women labour explain 72 percent in cotton production. The inputs, irrigation and human labour show negative contribution to the production of cotton during the period 1973 – 75. The marginal value production of irrigation and human labour are found to be less than zero in case of cotton crop. It indicates that the production of cotton with respect to the inputs has the negative M.V.P. and is carried on in the third stage of production.

Subba Ramaraju, Veera Reddy and Damodar Reddy[2] studied the resource efficiency and returns to scale in Groundnut production in Mahaboobnagar district of Andhra Pradesh. The study indicates that the manures and irrigation formed the most influencing factors under irrigated conditions. The returns to scale under irrigated conditions were found to be significantly different from unity. The unirrigated farms experienced constant returns to scale and it is not significantly different

K.R. Shanmugam[3] studied farm specific technical efficiency of raising major commercial crops. He employed stochastic frontier production function technique to measure the technical efficiency of rice, groundnut and cotton in Tamilnadu. The technical efficiency of raising irrigated groundnut is relatively high in own land cultivation as compared with that in leased land cultivation. Farmers having a high promotion of family members with above middle school education are more efficient in raising groundnut.

U.M.Jha[4] in his book (1984) "Irrigation and agricultural development" emphasized importance of water as input in agriculture sector in India. Similarly, V.K.Sarma in his research study (1985) on "Water Resources Planning and Management" referred to a wide spectrum of water resource used for economic development of nation.

M. S. Shirahatti, C. J. Itnaland D. S. Mallikarjunappa Gouda[5] (2005) conducted a field experiment at Agricultural Research Station, Hanumanmatti for comparing the drip and furrow irrigation methods on the hybrid cotton yields in the red sandy loam soil of northern Karnataka. The results of the experiment indicated that by applying same quantity and 50 per cent of water as of surface

irrigation (control), the yield was increased by 28 and 10 per cent respectively. When the water applied in the drip irrigation was 25 per cent of the control, the yield was reduced by just 2.5 per cent, but in this case highest water use efficiency was observed. The soil moisture distribution along the vertical direction increased and laterally it was decreased.

Pemsl, Waibel, and Orphal (2004) in their study found under non-irrigated conditions there would be no reason for farmers to adopt Bt cotton. Under irrigated conditions stochastic dominance shows, pesticide alone is the superior strategy. The regression analysis found pest pressure and cotton output price largely determine the yield.

2. Methodology

Commercial crops grown under rain fed conditions are high risk corps. The farmers are naturally reluctant to increase their investment in such crops. Andhra Pradesh is an important producer of commercial crops like Groundnut, Cotton, Tobacco, Chillies, Sugarcane and Onions. The demand of commercial crops is increasing day by day. Cotton is a commercial crop and its prices are high. The price from season to season depends on its overall production in the country. To meet increasing demand of Cotton, it is necessary to know the future estimates of cotton production. To study the impact of irrigation on Cotton crop in Kurnool District simple regression modol was used. The objectives of the present study are

- To find out trends as well as growth rate and instability in production of Cotton crop in irrigated area in Kurnool District.
- To study the impact of rainfall and irrigation on cotton cultivation in Kurnool district

1. To analyze the cotton cultivation in Andhra Pradesh and in Kurnool district, it is proposed to estimate the growth and instability in area, production and yield of cotton. There are two types of growth rates viz., linear and compound growth rates. In present study both linear and compound growth rates of cotton were estimated to determine the LGR, the linear function of the form

$$Y = A + Bt \quad \text{---------- (1)}$$

$$LGR = \frac{\hat{B}}{Y} \times 100 \quad \text{---------- (2)}$$

To determine the CGR, the exponential function of form is

$$Y = A.B^{t} \quad \text{---------- (3)}$$

Where, Y= area/production/yield

t= time

A, B are the constants to be determined

The % of CGR is $CGR = (B - 1) \times 100$ ---------- (4)

The coefficient of time $\hat{B}$ was tested by t-test statistic

$$t = \frac{\hat{B}}{SE of \hat{B}}$$

$$\text{where S.E of } B = \sqrt{\frac{\sum (Y - \hat{Y})^2}{N}}$$

The instability measured by coefficient of variation (C.V.)

$$C.V. = \frac{\sigma}{Y} \times 100 \quad \text{---------- (5)}$$

2. Cotton cultivation in Kurnool district depends on two sources of water viz. rainfall and irrigation. To determine the impact of each source on cotton cultivation a multiple regression analysis was carried out. Since the data related to irrigated area under different sources in Kurnool district is not sufficiently available, the study considered the total irrigated area under cotton crop (surface water, ground water and other sources) as a single independent variable. The rainfall is another independent variable included in the model. Therefore the proposed multiple regression equation in the study is given as

$$Y_t = a_0 + a_1 X_1 + a_2 X_2 \quad \text{---------- (6)}$$

Where, Y_t = Total cotton area/production/yield

X_1= Rainfall (in m.m)

X_2= Irrigated area under cotton crop

The effect of X_1 and X_2 variables on Y was tested by t - Test statistic independently.

The collective effective of independent variables on dependent variable is called Multiple correlation coefficient. It is denoted by R^2.

$$R^2 = 1 - (? e_i^2 / ? y_i^2) \text{ ---------- (7)}$$

To test the significance of the combined effect of all independent variables on dependent variable, F-test statistic was adopted.

$$F = \frac{R^2/(K-1)}{(1-R^2)(N-K)} \text{ ---------- (8)}$$

Where N = Number of Observations
K = Number of Variables

3. Data

The data related to the present study is obtained from secondary sources. The relevant data was collected from various issues of "Seasons and Crop Report of A.P." and "Statistical Abstract of Andhra Pradesh" issued by the Director of Bureau of Economics and Statistics, Andhra Pradesh and the "Chief Planning Officer, Kurnool". The data relating to area under cotton, rainfall, cotton yield and production obtained from the secondary sources is used to estimate the model.

4. Limitations of the study

The study is confined to Kurnool district only. The study covers the cultivation of cotton crop only. The study of cultivation of crop is limited to growth & instability and impact of irrigation on cotton cultivation. The period of study is 1985-86 to 2004-05.

5. Compound Growth Rates in Cotton Irrigated Area

5.1 Area

The estimated exponential form of irrigated area of cotton in Kurnool district is as given below

$$Y = (0.0413)\ (1.7706)^t$$
$$(0.1914)$$
$$CGR = 77.0607 \quad C.V = 58.3952$$

From the above mentioned equation the value of b, i.e. the coefficient of t is 1.7706. It expresses the average annual increase over the previous year in irrigated area under cotton crop. The compound growth rate of irrigated area is 77.0607. It reveals that the average annual growth in cotton crop area over the previous year is 77.0607. The value of intercept term is 0.0413. The annual growth in irrigated area under crop is not significant. It is inferred that the growth in irrigated area of cotton crop is Kurnool district is positive because natural conditions for cotton crop is favourable than other irrigated crops. So the farmers prefer cultivating cotton instead of other crops. It is proved by 't' – test statistic.

5.2 Production

The estimated exponential form of the cotton production in Kurnool district is

$$Y = 0.1071\ (2.2713)^t$$
$$(1.0737)$$
$$CGR = 127.1330 \quad C.V = 64.5880$$

From the above estimated equation the value of b is 2.2713. It expresses the average annual increase in cotton production. The compound growth rate of cotton production is 127.1330. It reveals that the average annual growth rate in cotton production over the previous year is 127.1330. The value of intercept term is 0.1071. The annual growth in cotton production under irrigated area is positive and not significant. It is proved by 't' –test statistic. The instability in Cotton production is 64.50 percent.

5.3 Yield

The estimated exponential form of the cotton yield in Kurnool district is

$$Y = 0.1360\ (1.7085)^t$$
$$(0.1795)$$
$$CGR = 70.8529 \quad C.V = 16.8424$$

From the equation the value of b i.e. coefficient of t is 1.7085. It expresses that the average annual increase in cotton yield. The compound growth rate of cotton yield is 70.8529. It reveals the average annual growth rate in cotton yield over the previous year is 70.8529. The value of intercept terms is 0.1360. The annual growth in cotton yield is insignificant. It is noticed that the cotton yield in Kurnool district is significant and also better than the other crops. It is proved by 't' – test statistic.

To study the impact of irrigation on cotton cultivation in Kurnool district, the multiple regression model of the form (given in the

methodology) cotton area/production/yield as the dependent variables and independent variables are rainfall and total irrigated area under cotton crop. Both the linear and log linear models were estimated by adopting OLS method and the parameters are given in equation form. Initially the study considered that the total area under the cotton crop is influenced by the rainfall and irrigated area, i.e. the impact of two independent variables on the dependent variable, cotton area was estimated.

5.4 Area-Impact of Irrigation

The estimated linear regression model is

$$Y_t = 80.1299 + 55.6117^{*} X_1 + 2.89404^{*} X_2$$
$$(5.7862) \quad (8.0115)$$
$$R^2 = 0.9829^{*} \qquad F = 487.4461$$

* Significant at 5% probability level

Figures in the parenthesis are 't' values.

It is observed that the coefficients of rainfall and irrigated area are positive (55.6117 and 2.894). A positive relationship was established by these two independent variables each with the total cotton area in the district. To test the significant effect of these variables, t-test statistic was calculated. From the t-test statistic, it is proved that the effect of each of these two independent variables on cotton area is a significant effect. For every one unit of X_1 variable will increase a total cotton area by 55.61 hectares. This increase in total cotton area is significant. Similarly, it is observed that effect of irrigated area on total area is also positive and significant. Hence, a positive and significant effect was established between irrigated area and total area. For every one hectare increase in irrigated area will increase the total area by 2.89 hectares. The aggregate effect of these two independent variables rainfall and irrigated area is expressed by the value of R^2. The estimated multiple correlation coefficient (R^2) is 0.9829. More than 98% of variation in total cotton area was shown by these two variables collectively. This combined effect of independent variables (98.29% of variation) was tested for its significance, from F-test statistic. This aggregate effect is a significant effect.

The estimated log-linear model with the above variables is

$$Y_t = 5.025 + 0.1593\, X_1 + 0.5484^{*} X_2$$
$$(0.8959) \quad (8.4329)$$
$$R^2 = 0.8501^{*} \qquad F = 48.2046$$

In the fitted equation, the coefficient of irrigated area is positive and significant. It reveals that there exists a positive and significant relation between irrigated area and total cropped area. An increase in irrigated area will reflect a significant increase in total cotton area. But, the rainfall will establish a positive relationship with total area.

It is also observed that the aggregate effect of the two variables on cotton area is significant, proved by F-test statistic. Observing the two estimated equations, the irrigated area shows a positive and significant effect whereas the rainfall shows only positive effect, and is significant in linear model alone.

It is found that total cotton area may be increased significantly by raising the irrigated area in Kurnool district. The variation in the total cotton area is significant by the two selected variables. From the above discussion it is advised to raise the cotton area by raising the irrigated area. The irrigated area may be increased through increasing the ground water and surface water flows and other irrigation channels. The ground water level may be raised by the construction of check dams and deepening of tanks.

5.5 Production- Impact of Irrigation

The impact of rainfall and irrigated area on cotton production in the district was estimated by multiple regression equation. The estimated equation along with 't' values and multiple correlation coefficient (R^2) is given by the fowling equation.

$$Y_t = 10704.1875 + 37.3272\, X_1 + 4.2420^{*} X_2$$
$$(0.6893) \quad (4.5298)$$
$$R^2 = 0.6466^{*} \qquad F = 15.5547$$

* Significant at 5% probability level.

Figures in the parenthesis are't' values.

In the above estimated equation, the coefficient of rainfall (X_1) is positive and it is 37.3272. A positive relationship between rainfall and cotton production was observed.

From t-test statistic, it is noticed that the effect of rainfall on production is not significant. For every one unit increase in rainfall, 37.33 units of cotton production is increased. But this increase in cotton production is not significant increase. The estimated regression coefficient of irrigated area on cotton production is positive and it is 4.242. From t-test statistic it is proved that the irrigated areas effect is significant on cotton production. For every one hectare increase in irrigated cotton area will increase the cotton production by 4.24 bales. This increase in cotton production is a significant increase. Therefore, the impact of the two selected variables on cotton output is positive, but the effect of only irrigated area is a significant one. The aggregate effect of two selected independent variables on cotton output is represented by multiple correlation coefficients (R^2). The estimated value of R^2 is 0.6460. Therefore, the variation in cotton production by these two variables is 64.6%. The aggregate effect of the independent variables on production is significant at 5% probability level is given by F-test statistic.

The estimated log linear production function is

$$Y_t = 3.936 + 0.0878\,X_1 + 0.7268^{*}\,X_2$$
$$(0.2626) \quad (5.9441)$$
$$R^2 = 0.7265^{*} \quad F = 22.5843$$

Observing the estimated log linear model, both the independent variables establish a positive relationship with cotton production in the district. The effect of irrigated area on cotton production is significant. About 72.65% of variation in cotton output was recorded by these selected variables. The variation in production is observed to be significant.

From the above analysis, it is observed that cotton production is significantly influenced by the irrigated area. Therefore, to raise the cotton production more area may be brought under irrigation. It is suggested that to extend the irrigation facilities through construction of irrigation projects and stop wastage of rain water, develop proper channel system and proper harvesting of rainfall to raise the cotton production in the district.

5.6 Yield- Impact of Irrigation

The estimated linear regression model is

$$Y_t = 177.339 - 0.0123\,X_1 + 0.002\,X_2$$
$$(0.1551) \quad (1.4664)$$
$$R^2 = 0.1299 \quad F = 1.2692$$

It is observed that the coefficient of rainfall is negative (-0.0123). A negative relationship between yield and rainfall indicates that, a rise in rainfall in mm has actually led to decline in yield . But this decline is very negligible and it is not significant as shown by 't' statistic. For every unit increase in rainfall there is a decline of cotton yield by 0.0123 units. The estimated regression coefficient of irrigated area on cotton yield is positive and it is 0.002. From 't' statistic it is proved that the irrigated area's effect is not significant on cotton yield. For every one unit increase in irrigated area, cotton yield is increased by a meager amount of 0.002 units. This is not a significant increase. The aggregate effect of two selected independent variables on cotton yield is represented by multiple correlation coefficient (R^2). The estimated value of R^2 is 0.1299. This indicates that the variation in cotton yield due to these two variables is just 12.99 percent. This combined effect of independent variables on cotton yield is not significant at 5 percent probability level as shown by F – Test statistic.

The estimated log linear production function is

$$Y_t = 3.992 - 0.061\,X_1 + 0.1764\,X_2$$
$$(0.2366) \quad (1.8821)$$
$$R^2 = 0.1886 \quad F = 1.9754$$

Observing the above estimated log linear model, rainfall established a negative relationship with cotton yield. The coefficient of rainfall on cotton yield is -0.061. This indicates that a unit increase in rainfall will decline the yield by 0.061 units. But this decline is not a significant decline as shown by 't' statistic. There is a positive relationship between irrigated area and cotton yield (0.1764). For every unit increase in cotton irrigated area, cotton yield increases by 0.1764 units. But this increase in cotton yield due to increase in irrigated area is not a significant increase proved by t – Test statistic. The

Observing the above estimated log linear model, rainfall established a negative relationship with cotton yield. The coefficient of rainfall on cotton yield is -0.061. This indicates that a unit increase in rainfall will decline the yield by 0.061 units. But this decline is not a significant decline as shown by 't' statistic. There is a positive relationship between irrigated area and cotton yield (0.1764). For every unit increase in cotton irrigated area, cotton yield increases by 0.1764 units. But this increase in cotton yield due to increase in irrigated area is not a significant increase proved by t – Test statistic. The combined effect of irrigated area and rainfall on cotton yield represented by R^2 is 0.1886. This shows that only 18 percent of variation is found in the cotton yield due to variation in the two selected independent variables.

From the above analysis it is observed that cotton yield is not significantly influenced by the rainfall and irrigated area in Kurnool district.

The estimated regression coefficients of the equation are given in the table 1. The equation was fitted for cotton area, production and yield in Kurnool District. Both linear and log linear models are estimated.

Table 1 : Estimated Regression Coefficients - Irrigation

Dependent Variable	Model	Intercept	X_1 Rainfall	X_2 Irrigated Area	R^2	F
Area	Linear	80.1299	55.6117*	2.89404*	0.9829*	487.4461
	LogLinear	5.025	0.1513	0.5484*	0.8501*	48.2046
Production	Linear	10704.1875	37.3272	4.2420*	0.6466*	15.5547
	LogLinear	3.9360	0.0878	0.7268*	0.7265*	22.5843
Yield	Linear	177.339	0.0123	0.0020	0.1299	1.2692
	LogLinear	3.992	0.0610	0.1764	0.1886	1.9755

*** Significant at 5% probability level.**

From the above table it is observed that the area under the cotton crop was significantly influenced by both the selected variables – rainfall and irrigated area in case of linear model. The two explanatory variables explained 98.3 percent of variation in cotton area. This is a significant variation. With respect to log linear model, these two variables show 85 percent variation. The cotton area was significantly influenced by irrigated area only. Therefore, it can be concluded that cotton is an irrigated crop in Kurnool District.

The cotton production was positively influenced by the two variables – rainfall and irrigated area. Cotton production was significantly influenced by irrigated area. The cotton production variation was significantly influenced by these two variables (64.66% and 72.65%) in both the models. Therefore, it is inferred that the cotton production was mainly dependent on irrigated area.

A negligible positive effect was recorded by the two selected variables on cotton yield. The value of intercept term is considerably high, reveals that the cotton yield was influenced by other variables which are not included in the model. These two selected variables recorded only 13 percent and 18.86 percent yield variation in both linear and log linear models. Finally, it is inferred that the cotton crop was mainly irrigated crop. The cotton yield can be increased by focusing on other factors which include HYV seeds, new agricultural technology, fertilizers and pesticides and plant protection methods.

6. Conclusion

The effect of rainfall and irrigated area on cotton area, production and yield was estimated

by the multiple regression model. Both the linear and log-linear models were fitted using OLS method. From the estimated regression equations, the rainfall and irrigated area's effect on total cotton area is positive and significant. About 98 percent of variation in total cotton area was observed by these two variables. This aggregate effect is observed to be a significant. It is noticed that the total cotton area may be increased significantly by raising the irrigated cotton area. The irrigated cotton area may be increased through the increase in ground water and surface water flows. Proper harvesting of rainfall can improve the ground water.

The established relationship between cotton production and the two independent variables, namely rainfall and irrigated area reveals that the irrigated area's effect on cotton production is positive and significant. The effect of rainfall on production is positive but not significant. It is also noticed that the aggregate effect of these two variables is significant as given by the R^2 value and F-test statistic. It is therefore concluded that the irrigated area significantly influenced the cotton production. So to raise the cotton production more area should be brought under irrigation. The increase in irrigated area is possible, by taking appropriate measures like construction of check dams, irrigation projects, proper canal systems restricting the wastage of rain water, deepening of tanks, and construction of new tanks.

The net effect of irrigated area on cotton yield is positive but not significant. An insignificant negative effect of rainfall on cotton yield was observed. The aggregate effect of these two variables is also insignificant. From the above it is noticed that the cotton yield was not influenced by the two water sources. But it could be influenced by new technology. As indicated by the high value of intercept term. Therefore other factors like HYV seeds, fertilizers and pesticides, farm mechanization, plant protection methods may increase the cotton yield.

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Satisfaction of ATM Card Users with reference to Gujarat

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Abstract

This paper examines the perceived satisfaction of ATM card users based on various attributes in Gujarat. It evaluates the difference of satisfaction for some demographic factors of ATM users. A sample of 389 consumers was personally surveyed using structured questionnaire. Using statistics like descriptive analysis, t – test, ANOVA test, factor analysis and median ranking, the hypotheses were tested. The factor analysis reduced variables from 16 to 5 and then t – test and ANOVA test for different demographic groups are conducted. Significant difference of satisfaction is found out in some demographic groups which may be useful for decision makers in ATM card users' markets. Through median ranking, relative importance to factors are identified. The results may help the decision makers to serve consumers better. The findings may also be useful for further researchers. The decision makers may also be helped by knowing relative importance assigned to different factors by respondents so that they can serve the market better.

Key words : ATM card user; Consumer Satisfaction; Demographic factors; Modern banking; Median ranking.

1. Introduction

Automated Teller Machines (ATMs) are the first well-known machines to provide electronic access to consumers. ATM is designed to perform one of the most important functions of bank i. e. delivery of cash. It is operated by plastic card with its special features. The plastic card is replacing cheque, personal attendance of the consumer, restrictions of banking hours and paper based verifications. ATMs have made cash just seconds away throughout the day and night in every corner of the globe. One has reasons to assume that consumers are more satisfied with ATMs compared to traditional banking methods.

2. Review of literature

Consumer satisfaction is described as psychological state to evaluate the reasonableness between what a consumer actually gets and gives (Howard and Sheth, 1969). It is observed that consumer satisfaction resulted from purchasing and using a certain product makes consumer to compare the expected reward and the actual cost of the purchase (Churchil and Suprenant, 1982). Studies show that the price decision also influences consumers' satisfaction in service industries (Voss, Parasuraman and Grewal, 1998). The service industries are mostly consumer driven and their survival in competitive environment largely depends on quality of the service provided by them. In this context, quality of service furnished by banking industry, which is a part of service sector is very important and profitability of their business is closely connected to the quality of service they render (Zahorik and Rust, 1992; Rust, Zaorik and Keiningham, 1996).

The demographics and consumer satisfaction in general is related as observed by several researchers in services marketing (Badiyani, 2009). Gender is not found very much impacting factor in adoption of technology in general (Taylor and Todd, 1995) but when we talk of computer specific technology, men were found more likely to adopt the technologies (Gefen and Straub, 1997). Young people tend to adopt more of technology if age is a factor (Zeithaml and Gilly, 1987; Trocchia and Janda, 2000; Lee, Lee and Schumann, 2002). Adoption of innovation is directly related with education and income (Jayawardhena and Foley, 2000; Karjaluoto, Mattila and Pento, 2002).

The adoption of technology and satisfaction of consumers in using technology in banking is

being extensively researched by several authors (Mukherjee and Nath, 2003; Wang, Wang, Lin and Tang, 2003; Jaruwachirathanakul and Fink, 2005; Eriksson, Kerem and Nilsson, 2005; Sayar and Wolfe, 2007). Some researchers examined banks' ATM adoption decisions (Saloner and Shepard 1995). Many researchers worked on empirical examination of the various factors affecting ATM pricing (Prager, 1999, Prager, 2001; Hannan, et al., 2003). A few researchers have worked on developing theoretical models to introduce and analyse the idea of indirect effect of ATM surcharges on bank profitability (Massoud and Bernhardt, 2004). Some researchers observed an association between consumers' usage patterns of ATMs and their demographic profiles (Hood, 1979; Murphy, 1983) and consumer psychographic profiles (Stevens *et al.*, 1986). The adoption rates of new technologies for the elderly are usually much lower than those for the younger age groups (Kerschner and Chelsvig, 1984). A study on ATMs observed how retail bank consumers perceive ATM technology and how far they accept this innovation as one, which can fully and satisfactorily replace human tellers in all the banking functions handled by the innovation (Rugimbana and Iversen, 1994).

3. Objectives and hypotheses

The objectives of the study are

1. To identify the difference of perceived satisfaction between male and female.
2. To uncover the difference of perceived satisfaction among different age groups.
3. To examine the difference of perceived satisfaction among different education groups.
4. To unearth the difference of perceived satisfaction among different income groups.
5. To know the relative importance of factors in ATM card usage.

From the objectives, following hypotheses are framed.

H_o1 : There is no significant difference in perceived satisfaction between male and female.

H_o2 : There is no significant difference in perceived satisfaction among different age groups.

H_o3 : There is no significant difference in perceived satisfaction among different education groups.

H_o4 : There is no significant difference in perceived satisfaction among different income groups.

In addition to above hypotheses, the researcher attempted to find out the relative numbers given by consumers to the factors related to ATM card usage.

4. Research methodology

4.1. Data collection tool.

One of the primary concerns of this paper is to identify the important factors affecting the ATM card users' satisfaction in Gujarat. The 16 service quality dimensions of ATM service are identified in consultation with several bank officers and few frequent users which are taken here to evaluate satisfaction of ATM card users. Through a structured questionnaire data were collected for final analysis. The structured questionnaire was administered by the researcher. Survey questionnaire included a number of questions related to ATM card users' satisfaction and the responses have been recorded on five point likert type scale (1 = not at all important and 5 = extremely important). The questions related to demographic profiles of the respondents such as gender, age, education and income were also included. The pearson correlation r between even and odd items found is 0.807241 which shows that the scale is reliable.

4.2. Sampling

Out of total 400 questionnaires administered, 389 questionnaires were found valid for analysis. Sample size selection here is based on expert opinion. Sampling technique used here is convenience sampling. The geographic area selected here is Gujarat state. Three cities, five towns and eight villages are selected for collecting the data.

4.3. Data analysis

Data collected were analysed through MS Excel and SPSS. Data analysis methods used in the study are t test, ANOVA test, factor analysis and median ranking.

5. Data Analysis and Discussion

Satisfaction with reference to each of 16 factors is measured on five point likert scale. The reliability analysis is done for 16 factors and the cronbach alfa found is 0.7142. Comparison of observed satisfaction is also made on the basis of various demographic factors which is shown below.

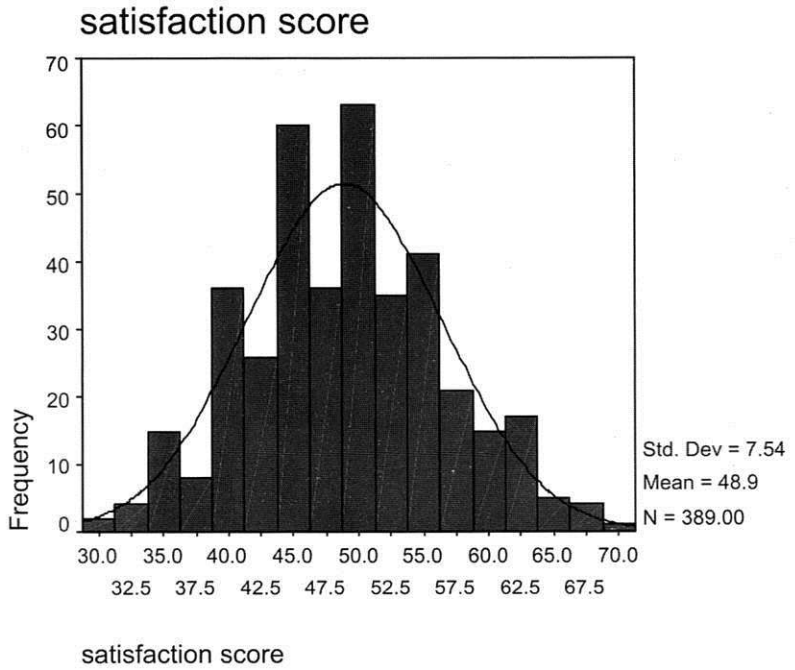
5.1. Consumers' profile

The consumers' demographic profiles are shown in table 1.

Table No. 1 : Demographic profile of consumers.

Gender groups		**%**	**Education groups**		**%**
Male	290	74.55	Upto schooling	102	26.22
Female	99	25.45	College graduate	204	52.44
Age groups (years)			Post graduates or more	83	21.34
Less than 25	84	21.59	**Income groups (p. a.)**		
25 – 55	164	42.16	Less than 1,00,000	83	21.34
Above 55	141	36.25	1,00,001 – 3,00,000	166	42.67
			Above 3,00,000	140	35.99

Frequencies for satisfaction shows a normal curve which is shown in Graph 1.



5.2 Comparison of satisfaction through different demographic factors

Various factors are considered for comparison like gender, age, education and income.

5.2.1. Factor analysis

To reduce the no. of factors the factor analysis is done. Sixteen factors are classified in five groups. The extraction method is principal component analysis and varimax rotation. The total variance is explained in table 2 and rotated matrix is shown in table 3.

Table No. 2 : Total variance explained.

	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.050	25.312	25.312	4.050	25.312	25.312	3.115	19.467	19.467
2	2.481	15.509	40.821	2.481	15.509	40.821	2.734	17.086	36.553
3	2.389	14.932	55.754	2.389	14.932	55.754	2.437	15.230	51.783
4	2.209	13.805	69.559	2.209	13.805	69.559	2.353	14.708	66.490
5	1.661	10.382	79.941	1.661	10.382	79.941	2.152	13.451	79.941
6	0.777	4.856	84.797						
7	0.608	3.800	88.597						
8	0.521	3.254	91.851						
9	0.445	2.781	94.632						
10	0.284	1.774	96.406						
11	0.179	1.121	97.526						
12	0.128	0.797	98.323						
13	0.094	0.584	98.908						
14	0.068	0.428	99.335						
15	0.058	0.365	99.701						
16	0.048	0.299	100.000						
Extraction Method: Principal Component Analysis.									

Here the total variance explains that the five factors explains 79.941 % of the total variables which are grouped and named accordingly in the rotated component matrix shown in table 3.

The extraction method used here is principle component analysis. The rotation method is varimax with Kaiser normalization.

Table No. 3 : Rotated component matrix

	Component				
	Trust and security	Speed	Convenience	Cost	References
safe place	**0.55547**	-0.05626	-0.02353	-0.08474	0.059382
safe pin no.	**0.945691**	0.124593	-0.02766	0.023056	0.112019
trustworthiness of machine	**0.95098**	0.113211	-0.07016	0.030487	0.105287
security person at the ATM machine	**0.953634**	0.130414	-0.04706	0.022681	0.115305
speed of transaction	0.030975	**0.901745**	0.035472	-0.04802	0.030929
ATM centre having no longer queues	0.107387	**0.932494**	-0.02278	-0.03629	0.076088
speed of solution if problem	0.079419	**0.919749**	-0.03894	-0.0304	0.098156
references by consumers	0.163107	0.038145	0.056693	-0.06421	**0.943085**
advertisements	0.14811	0.023051	0.055971	-0.07999	**0.949731**
references by bank persons	0.078938	0.380621	-0.24712	-0.02112	**0.541778**
proximity from consumer's place	-0.07482	0.007379	**0.930671**	0.003153	0.033233
convenience of transaction	-0.09289	0.010564	**0.937443**	-0.00265	0.002745
convenience of other services	0.014583	-0.05769	**0.777862**	0.057708	-0.04507
charges of card	-0.08723	-0.05831	-0.04168	**0.865536**	-0.05522
charges for connectivity with other bank	-0.01108	-0.05326	0.043027	**0.929777**	-0.04678
charges for solving problems	0.047911	-0.00048	0.06332	**0.843531**	-0.04539
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					

The grouping of the factors are done on the basis of factor analysis and following five names are given accordingly.

1. Trust and security : Trust and security is the most important factor which includes safe place, safe pin no., trustworthiness of machine and security person at the ATM machine.

2. Speed : Speed includes speed of transaction, ATM centre having no longer queues and speed of solution if problem arises.

3.References:References here include references by consumers, advertisements and references by bank persons.

4. Cost : Cost includes charges of card, charges for connectivity with other banks and charges for solving the problems.

5. Convenience:Convenience here includes proximity from consumer's place, convenience of transaction and convenience of other services.

The abovementioned five factors are then used for the testing of the hypotheses related to demographic factors.

5.2.2 t–test and ANOVA test for demographic comparison

The t – test for gender wise comparison and one way ANOVA test for age, education and income wise comparison are shown in table 4.

Table No. 4 : t test and ANOVA test results.

Factors	Gender (t test)	Age (ANOVA)	Education (ANOVA)	Income (ANOVA)
Trust and security	4.475*	1.959	42.263*	6.832*
Speed	0.329	0.527	12.806*	3.370*
Convenience	0.562	0.600	16.337*	9.456*
Cost	-0.239	0.40	2.449	0.673
References	0.450	1.608	6.405*	4.855*
Total	3.116*	3.370*	81.986*	18.275*

* = significant at 0.05 signifance level.

If we consider gender group differences of satisfaction in the above five factors, only trust and security factors have significant difference between male and female while all other factors including speed, convenience, cost and references do not have significant differences between male and female. Looking at means, males are more satisfied than females in terms of trust and security factors where decision makers need to pay attention.

Age groups do not have significant differences in any of the factors but, total has a significant difference. For finding out the groups differences post hoc Tuckey test is done which is shown in table 5.

Table No. 5 : Multiple comparison : tuckey HSD for age groups.

Dependent Variable	(I) age (years)	(J) age (years)	Mean Difference (I-J)	Std. Error
Total	Less than 25	25 – 55	2.4562*	1.0056
		Above 55	0.9288	1.0330
	25 – 55	Less than 25	-2.4562*	1.0056
		Above 55	-1.5273	0.8608
	Above 55	Less than 25	-0.9288	1.0330
		25 – 55	1.5273	0.8608

* The mean difference is significant at the .05 level.

Above table shows the significant difference of satisfaction among the age groups for total satisfaction score where "*" means significant difference at 0.05 significance level.

Education groups have significant differences in four factors including trust and security, speed, convenience and references. For finding out the groups differences post hoc Tuckey test is done which is shown in table 6.

Table No. 6 : Multiple comparison : tuckey HSD for education groups.

Dependent Variable	(I) education	(J) education	Mean Difference (I-J)	Std. Error
Trust and security	Upto schooling	College graduate	0.574107*	0.110121
		Post graduates or more	-0.46831*	0.134237
	College graduate	Upto schooling	-0.57411*	0.110121
		Post graduates or more	-1.04241*	0.118225
	Post graduates or more	Upto schooling	0.468306*	0.134237
		College graduate	1.042413*	0.118225
Speed	Upto schooling	College graduate	0.254867	0.117738
		Post graduates or more	-0.37974*	0.143522
	College graduate	Upto schooling	-0.25487	0.117738
		Post graduates or more	-0.63461*	0.126403
	Post graduates or more	Upto schooling	0.379742*	0.143522
		College graduate	0.634609*	0.126403
Convenience	Upto schooling	College graduate	-0.00186	0.116741
		Post graduates or more	-0.68225*	0.142306
	College graduate	Upto schooling	0.001864	0.116741
		Post graduates or more	-0.68039*	0.125333
	Post graduates or more	Upto schooling	0.68225*	0.142306
		College graduate	0.680385*	0.125333
References	Upto schooling	College graduate	0.135754	0.119721
		Post graduates or more	-0.31109	0.145939
	College graduate	Upto schooling	-0.13575	0.119721
		Post graduates or more	-0.44685*	0.128532
	Post graduates or more	Upto schooling	0.311095	0.145939
		College graduate	0.446848*	0.128532
Total	Upto schooling	College graduate	3.470588*	0.76808.
		Post graduates or more	-7.07796*	0.936284
	College gradu ate	Upto schooling	-3.47059*	0.76808
		Post graduates or more	-10.5485*	0.824608
	Post graduates or more	Upto schooling	7.077959*	0.936284
		College graduate	10.54855*	0.824608

* The mean difference is significant at the .05 level.

Above table shows the significant difference of satisfaction among the education groups for abovementioned four factors where "*" means significant difference at 0.05 significance level. Thus, in the above four areas decision makers need to pay attention to the shown education groups.

If we consider income groups differences of satisfaction in the five factors, trust and security, speed, convenience and references have significant differences among income groups while cost factors do not have significant differences among income groups. For finding out the groups differences post hoc Tuckey test is done which is shown in table 7.

Table No. 7 : Multiple comparison : tuckey HSD for income groups.

Dependent Variable	(I) income	(J) income	Mean Difference (I-J)	Std. Error
Trust and security	Less than 1,00,000	1,00,001 – 3,00,000	0.10006	0.132457
		Above 3,00,000	0.443317*	0.136495
	1,00,001 – 3,00,000	Less than 1,00,000	-0.10006	0.132457
		Above 3,00,000	0.343257*	0.113061
	Above 3,00,000	Less than 1,00,000	-0.44332*	0.136495
		1,00,001 – 3,00,000	-0.34326*	0.113061
Speed	Less than 1,00,000	1,00,001 – 3,00,000	0.307331	0.13362
		Above 3,00,000	0.33128*	0.137693
	1,00,001 – 3,00,000	Less than 1,00,000	-0.30733	0.13362
		Above 3,00,000	0.023949	0.114053
	Above 3,00,000	Less than 1,00,000	-0.33128*	0.137693
		1,00,001 – 3,00,000	-0.02395	0.114053
Convenience	Less than 1,00,000	1,00,001 – 3,00,000	0.539277*	0.131596
		Above 3,00,000	0.510009*	0.135608
	1,00,001 – 3,00,000	Less than 1,00,000	-0.53928*	0.131596
		Above 3,00,000	-0.02927	0.112326
	Above 3,00,000	Less than 1,00,000	-0.51001*	0.135608
		1,00,001 – 3,00,000	0.029267	0.112326
References	Less than 1,00,000	1,00,001 – 3,00,000	0.240449	0.133117
		Above 3,00,000	0.425915*	0.137175
	1,00,001 – 3,00,000	Less than 1,00,000	-0.24045	0.133117
		Above 3,00,000	0.185467	0.113624
	Above 3,00,000	Less than 1,00,000	-0.42592*	0.137175
		1,00,001 – 3,00,000	-0.18547	0.113624
Total	Less than 1,00,000	Less than 1,00,000	4.150602*	0.971401
		1,00,001 – 3,00,000	6.031756*	1.001017
	1,00,001 – 3,00,000	1,00,001 – 3,00,000	-4.1506*	0.971401
		Above 3,00,000	1.881153	0.829153
	Above 3,00,000	Less than 1,00,000	-6.03176*	1.001017
		Above 3,00,000	-1.88115	0.829153

* The mean difference is significant at the .05 level.

Above table shows the significant difference of satisfaction among the income groups for four factors where "*" means significant difference at 0.05 significance level. The rest one factor does not have significant difference at 0.05 significance level as shown in table 4. Thus, in the above four areas decision makers need to pay attention to the shown income groups.

6. Median ranking to factors.

To know the relative importance of various factors, median ranking of factors is used here. Median of each factor is found out from the numbers given to it by consumers. Median rank is corresponded with the median score.

Table 8 : Median ranking to factors.

Parameter	Median score.	Median rank.
safe place	4.9	3
safe pin no.	2.42	2
trustworthiness of machine	2.3	1
security person at the ATM machine	5.04	4
speed of transaction	5.42	5
ATM centre having no longer queues	8.6	10
speed of solution if problem	11.99	13
references by consumers	10.74	12
advertisements	14.19	15
references by bank persons	8.21	9
proximity from consumer's place	6.1	7
convenience of transaction	7.54	8
convenience of other services	14.74	16
charges of card	5.44	6
charges for connectivity with other bank	8.73	11
charges for solving problems	13.95	14

Here, trustworthiness of machine has got minimum median score i. e. 2.3 which means it is the most important factor considered by respondents. Thus, it is given first rank. Similarly, medians for all 16 factors are calculated and accordingly median ranks are corresponded to all 16 factors.

7. Policy implications.

Where trust and security factors are in consideration, decision makers should pay more attention to females as significant difference is found in satisfaction for the factors. In the case of overall satisfaction,

significant difference is found between males and females. Here also, females need more attention from decision makers as also found earlier (Gefen and Straub, 1997).

In age, no factors have significant difference in satisfaction. However, total satisfaction has significant differences in satisfaction. Here, less than 25 years group is more satisfied than 25 – 55 years group. Thus, 25 – 55 years group need attention from decision makers which are more prone to adapt newer technologies as found earlier. (Zeithaml and Gilly, 1987; Trocchia and Janda, 2000; Lee, Lee and Schumann, 2002).

In education groups, four out of five factors have significant difference of satisfaction i. e. trust and security, speed, convenience and references. Regarding trust and security factors, all the three groups i. e. upto schooling, college graduates and post graduates and more have significant differences of satisfaction among them. Here, graduates are less satisfied while post graduates and more are more satisfied than other groups. In speed factors, post graduates and more have significant difference of satisfaction with other two groups. Post graduates and more group is more satisfied than other two groups. In convenience factors, post graduates and more have significant difference of satisfaction with other two groups. Post graduates and more group is more satisfied than other two groups. In reference factors, graduates and post graduates and more groups have significant difference of satisfaction. Here also, post graduates and more group is more satisfied than graduates group. In total satisfaction, all three groups have significant difference of satisfaction. Here, graduates group is less satisfied while post graduates and more group is the more satisfied than other two groups.

In income groups, four out of five factors have significant difference of satisfaction i. e. trust and security, speed, convenience and references. In trust and security factors, above 3,00,000 p. a. income group has significant difference of satisfaction with other two groups. Here, above 3,00,000 p. a. income group is less satisfied than other two groups. In speed factors, there is a significant difference of satisfaction between upto 1,00,00 p. a. income group and above 3,00,000 income group. Here, above 3,00,000 p. a. income group is less satisfied than upto 1,00,000 p. a. income group. In convenience factors, upto 1,00,000 p. a. income group has significant difference of satisfaction with other two groups. Here, upto 1,00,000 p. a. income group is more satisfied than other two groups. In reference factors, there is a significant difference of satisfaction between upto 1,00,00 p. a. income group and above 3,00,000 income group. Here, above 3,00,000 p. a. income group is less satisfied than upto 1,00,000 p. a. income group. In total satisfaction, upto 1,00,000 p. a. income group has significant difference of satisfaction with other two groups. Here, upto 1,00,000 p. a. income group is more satisfied than other two groups.

It is also found earlier that adoption of innovation is directly related with education and income (Jayawardhena and Foley, 2000; Karjaluoto, Mattila and Pento, 2002).

Median ranking shows directions to decision makers that in which factor, they should pay more attention. Factors ranked at the top should be in the priority list of importance for decision makers in banking industry for better services. Thus, attention may be paid in the sequence to trustworthiness of machine, safe pin no., safe place, security person at the ATM machine, speed of transaction, charges of card, proximity from consumer's place, convenience of transaction, references by bank persons, ATM centre having no longer queues, charges for connectivity with other bank, references by consumers, speed of solution if problem, charges for solving problems, advertisements and convenience of other services.

8. Conclusion.

Banking industry is ever developing. It is true for Gujarat and India. Knowing satisfaction of the consumers can serve the purpose of growth and profit in the competitive environment. Differences in demographic groups and median ranking can indicate the directions to decision makers. With the need for further specific researches, this research may throw light on certain areas of improvement.

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A Study of Job Stress and Its Impact on Job Attitude

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1. Introduction

The life of people in the modern world is full of stress and anxiety, in spite of technological and scientific developments. Many people experience high or moderate degree of stress in their daily life. A feeling of frustration, dissatisfaction, psychosomatic and psychological disorders in the life of individuals reflect in high stress. Even psycho-social stress has been increasing due to change in the life style of people. Life has became mechanical, demands of new life style have been increased, time constraints, deadlines in work, future uncertainties have weakened social support. As a result, the life of majority of the people has become highly stressful in modern society.

Hans Selye (1956) defined stress as, non-specific responses of the body to any demand made upon it. Walter Cannon (1914) had used the term stress in his work on homeostasis that stress is emotional status that had possible, detrimental, and physical, impact on the focal organism.

Job Stress is the result of interaction of work conditions with characteristics of the worker such that a demand of the work exceeds the ability or the worker to cope with them.

Job stress and occupational stress are the two terms used interchangeably. Stress at work resulting from increasing complexities of work and its divergent demand, has become important characteristics of the modern organization associated with constrains and demands. Stress is an interaction of individual with environment (Ivancevich and Matteson1994).

Growing evidence suggests that high levels of stress adversely affect physical health, psychological well being, and many aspects of task performance (Quick J.C.1992). A nationwide survey conducted in USA by a large life insurance company showed that nearly 46 percent of American workers believe their jobs are highly stressful. (Northwestern National LIC, 1999).

J.R. Schermerhon Jr., Hunt J.R. and Richard N. Oshorn have identified task demands, role ambiguities, role conflicts, ethical demands, interpersonal problems, career developments and physical setting as common stressors.

Srivastav A.K. and Sing A.P. (1981) stated that in their study; role overload, role ambiguity, role conflict, group pressures, low profitability, under participation, low status, responsibility for people, intrinsic impoverishment, strenuous working conditions, poor peer relations and powerlessness are the reasons for stress.

DeFrank and Ivancevich (1998) pointed out those specific physical health concerns that have been linked to stress. These includes the – (i) immune system problems, where there is lessened ability to fight off illness and infection, (ii) cardiovascular system problems such as high blood pressure and heart disease, (iii) musculoskeletal system problems, such as headaches and back pain, (iv) gastrointestinal system

problems such as diarrhoea and constipation.

Peter Y. Chen and Paul E. Spector (1992) in an exploratory study found that stress had the strongest impact on aggressive actions, such as sabotage, interpersonal aggression, hostility and complaints.

Stress is produced by several happenings in life. Modern life is full of stress. It is a general observation that job stress is dysfunctional and it harms an individual. However, stress is not always undesirable and harmful. It has also positive side. This stress is called 'eustress'. Some researchers have contended that some sorts of job stress have functional qualities and others have reported that partial degree of stress is desirable to motivate the individual and at which his effectiveness is maximized. Kets de Vries (1979) pointed out that individuals need a moderate amount of stress to be alert and capable of functioning effectively. However when stress exceeds its limits and it can cause many problems.

2. Job Attitude

Job attitude means employee attitude towards the job. Attitudes are the feelings and beliefs that largely determine how employees will perceive their environment, commit themselves to intended actions and ultimately behave.

An extensive research by Smith (1969) suggested that there are five dimensions to the attitude, all of which reflect affective responses to particular aspects of a job. These dimensions are – the work itself, pay promotion, supervision and co-workers. Most of the research in Organizational Behaviour has been concerned with three attitudes, i. e. job satisfaction, job involvement and organizational commitment (Brooke Jr., Russell and Prince, 1988). Attitudes have three components viz. emotional, informational and bahavioural. All these components helps together to form an attitude.

3. Objectives

1. To study the job stress and job attitude between different occupations.
2. To study the impact of job stress on job attitude.
3. To determine whether the age is related with job stress and job attitude.

4. Methodology

The theoretical model suggests that job stress has got many consequences. It can also influence job attitude, consequently it can influence job performance. Based on this assumption the present study is undertaken to study the impact of job stress on job attitude. Further the study focuses on job stress between different occupations and its impact on job attitude.

5. Hypothesis

- There is relation between job stress and job attitude.
- Stress has impact on job attitude.

6. Tools for Data Collection

6.1 Job Stress Scale

To assess the stress, the occupational stress scale (Shrivastav and Singh, 1986) is used. The stress scale is administered in Likert-type five point scales in the manner of strongly disagree, disagree, undecided, agree and strongly agree. The job stress scale consists of items related to components of job life such as role overload, role ambiguity, role conflict, unreasonable group, responsibility for persons, under participation, powerlessness, poor peer relations, intrinsic impoverishment, low status, strenuous working conditions and unprofitability.

The reliability and validity of occupational stress scale is computed by spilt-half method and Cronbanch's alpha-coefficient for the scale and as a whole it found to be

0.935 and 0.90 respectively.

6.2 Job Attitude Scale

Attitude cannot be capture in single concept. It has various components. In the present study the focus is given on capturing the attitude in a set of variables mainly on job (work), promotions, supervision, coworkers and working conditions.

6.3 Item Judgment

After the item judgment fifteen questions were retained. On the basis of theoretical model the job attitude scale was prepared and developed. Thirty statements were prepared reflecting the job attitude in a five point scale.

On the basis of these six dimensions, thirty true-keyed items were formulated. A five point rating scale ranging from – 1. (strongly disagree) to 5(strongly agree), with '3' as moderate, were used with the item statement.

The job attitude scale was administered in Likert-type Five point scale. The scores are categorized on the basis of percentile values. The score below P_{25} categorized negative job attitude between P_{25} to P_{75} moderate job attitude and aboveP_{75} positive job attitude.

7. Sample

Eight occupations have been considered for the present study namely Principal, Lecturers, Bank Managers, Doctors, Managers in manufacturing organizations, Policemen, System Managers and Journalists. From every occupation 50 samples were collected. The sample of system managers is collected from Pune Districts and for rest occupations it is collected from Kolhapur district. The samples have been identified at random on the basis of convenience. Fifty samples from each occupation have been selected for the study.

8. Statistical Analysis

Mean, standard deviation, regression and correlation were applied for the study the job stress and job attitude in different occupations. The correlation model is used to study the relation between job stress and job attitude.

8.1 Findings

The present study is related to understand the stress level among the different job holders and their attitude towards their job.

Table No.1 : Job Stress and Job Attitude for different Occupations (N=50 for each occupation)

Occupations/Job	Job Stress		Job Attitude	
	Mean	S.D.	Mean	S.D.
Principals	115.20	16.84	54.82	6.97
Lecturers	112.94	19.26	56.10	7.96
Bank Managers	125.02	18.06	52.52	5.89
Doctors	125.78	16.24	54.28	6.37
Managers (Mfg. Org.)	127.56	17.65	53.68	7.06
Policemen	146.00	17.06	48.24	10.39
System Managers	124.16	13.12	53.40	5.65
Journalists	124.32	16.84	56.34	8.76

The table reflects the mean and S.D. of job stress and job attitude of eight occupations. The policemen have the highest stress (mean 146.00) followed by managers in manufacturing organizations (mean 157.56) and the lowest job stress is in the occupation of lecturers (mean 112.94).

8.2 Impact of Job Stress on Job attitude

To study the impact of job stress on job attitude, the data collected is analyzed as per job stress dimension with job attitude. For which regression tool has been used. The object of the present study is to study the predictive relation between job stress dimensions and job attitude. To analyze the data the job stress variable is considered as independent variable and job attitude variable is considered as dependent variable. The following table gives regression coefficient and their significance.

Table No.2 Regression Coefficients – For the Occupation of Principals.

Dependent variable - Job Attitude.

Independent variable (Job Stress dimensions)	Un standardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constants)	70.149	8.451		8.301	.000
Role overload	- 232	.262	-.115	-.885	.382
Role Ambiguity	-.158	.455	-.050	-.348	.730
Role Conflict	-.219	.475	-.074	-.462	.647
Unreasonable group	.233	.525	.080	.444	.660
Responsibility for persons	.701	.511	.212	1.372	.178
Under participation	7.883E-02	.587	.032	.134	.894
Powerlessness	-1.729	.719	-.499	-2.406*	.021
Poor Peer Relations	-.331	.480	-.109	-.689	.495
Intrinsic Impoverishment	-.516	.624	-.158	-.828	.413
Low Status	-.232	.775	-.058	-.299	.767
Strenuous Working Conditions	2.856E-02	.423	.012	.068	.947
Un profitability	7.186E-02	.493	.018	.146	.885

* $P \leq 0.05$

The 't' score between powerlessness dimension of job stress and job attitude is 2.406, which is significant at 0.05 level of significance. Among the various dimensions of job stress, the powerlessness component is negatively correlated with job attitude. It indicates that due to powerlessness principals experiences more job stress, which leads to negative job attitude. It reflects that stress has impact on job attitude.

Table No. 3ANOVA – Job Attitude and Job Stress for the Occupation of Principals.

Model	Sum of Squares	df	Mean square	F	Sig	$R.^2$
Regression	1632.885	12	136.074	6.726*	0.000	0.686
Residual	748.495	37	20.230			
Total	**2381.380**	**49**				

* $P < 0.01$

Table No. 4 : Regression Coefficients – For the Occupation of Lecturers.

Dependent variable – Job Attitude.

Independent variable (Job Stress dimensions)	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constants)	76.808	7.320		10.493	.000
Role overload	- 249	.262	-.126	-.951	.348
Role Ambiguity	.982	.480	.302	2.047*	.048
Role Conflict	-.216	.418	-.078	-.518	.608
Unreasonable group	.552	.418	.179	1.321	.195
Responsibility for persons	.330	.468	.084	.706	.485
Under participation	-1.12E-02	.377	-.004	-.030	.976
Powerlessness	-.302	.412	-.094	-.733	.468
Poor Peer Relations	-.281	.378	-.102	-.744	.462
Intrinsic Impoverishment	-.800	.436	-.255	-.834***	.075
Low Status	-2.227	.567	-.565	-3.931*	.000
Strenuous Working Conditions	-.873	.411	-.256	-2.122**	.041
Un profitability	.288	.502	.063	.573	.570

* P < 0.01 ** P < 0.05 *** P < 0.1

Further analysis reveals that intrinsic impoverishment, low status and strenuous working conditions these three components of job stress are significant and negatively correlated. It shows that there is job stress due to these components which interns to the negative job attitude in case of lecturers. It reflects that job stress has an impact on job attitude.

Table No. 5 : ANOVA – Job Attitude and Job Stress for the Occupation of Lecturers

Model	Sum of Squares	df	Mean square	F	Sig.	$R.^2$
Regression	2267.667	12	188.972	8.276*	0.000	.729
Residual	844.833	37	22.833			
Total	3112.500	49				

* P < 0.01

The 'F' score in the table is 8.276, which is significant at 0.01 level of significance. It shows that there is significant relation between job stress and job attitude in the occupation of lecturers.

Table No. 6 : Regression Coefficients – For the Occupation of Bank managers.

Dependent variable – Job Attitude.

Independent variable (Job Stress dimensions)	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Std. Error	Beta		
(Constants)	85.962	6.507		13.212	0.000
Role overload	3.751E-02	0.234	0.032	0.160	0.873
Role Ambiguity	-0.290	0.387	-0.101	-0.749	0.458
Role Conflict	-9.92E-02	0.396	-0.041	-0.250	0.804
Unreasonable group	-0.360	0.470	-0.147	-0.766	0.448
Responsibility for persons	0.366	0.406	0.119	0.903	0.372
Under participation	1.899E-02	0.351	0.009	0.054	0.957
Powerlessness	-1.040	0.503	-0.328	-2.067**	0.046
Poor Peer Relations	-1.400	0.404	-0.402	-3.468*	0.001
Intrinsic Impoverishment	0.195	0.410	0.067	0.477	0.636
Low Status	-8.28E-02	0.438	-0.027	-0.189	0.851
Strenuous Working Conditions	-0.468	0.390	-0.223	-1.201	0.238
Un profitability	-0.641	0.422	-0.191	-1.517	0.138

* $P < 0.01$ ** $P < 0.05$ *** $P < 0.1$

The further analysis reveals that the 't' score of powerlessness and poor peer relations of job stress dimension are significant and negatively correlated with job attitude. It indicates that due to these two dimensions bank managers' experiences more job stress, which leads to negative job attitude. It shows that there is impact of job stress on job attitude.

Table No.7 : ANOVA – Job Attitude and Job Stress for the Occupation of bank managers

Model	Sum of Squares	df	Mean square	F	Sig.	$R.^2$
Regression	1114.454	12	92.871	5.864*	0.000	0655
Residual	586.026	37	15.839			
Total	1700.480	49				

* P < 0.01

The 'F' value in the table is 5.864, which is significant at 0.01 level of confidence. It indicates that there is significant relation between job stress dimension and job attitude in case of bank managers. The following table shows regression coefficient between job stress dimension and job attitude.

Table No. 8 : Regression Coefficients – For the Occupation of Doctors

Dependent variable – Job Attitude.

Independent variable (Job Stress dimensions)	Unstandardized coefficients		Standardized coefficients	T	Sig.
	B	Std. Error	Beta		
(Constants)	76.231	5.871		12.985	0.000
Role overload	3.235E-02	0.199	0.021	0.163	0.871
Role Ambiguity	0.251	0.297	0.107	0.843	0.405
Role Conflict	-6.23E-02	0.427	-0.023	-0.146	0.885
Unreasonable group	-0.419	0.260	-0.204	-1.612	0.115
Responsibility for persons	0.619	0.346	0.215	1.788***	0.082
Under participation	0.324	0.354	0.149	0.914	0.367
Powerlessness	-0.551	0.476	-0.172	-1.157	0.255
Poor Peer Relations	-0.869	0.332	-0.341	-2.616**	0.013
Intrinsic Impoverishment	-0.505	0.404	-0.169	-1.251	0.219
Low Status	-0.809	0.614	-0.203	-1.317	0.196
Strenuous Working Conditions	-0.871	0.330	-0.340	-2.642**	0.012
Un profitability	0.585	0.507	0.138	1.154	0.256

** P < 0.05 *** P < 0.1

The further analysis reveals that poor peer relations and strenuous working conditions component of job stress are significant and negatively correlated with job attitude. It indicates that poor peer relations and strenuous working condition results in more job stress, which leads to negative job attitude among the doctors. It reflects that job stress has an impact on job attitude.

Table No. 9 : ANOVA – Job Attitude and Job Stress for the Occupation of Doctors

Model	Sum of Squares	df	Mean square	F	Sig.	$R.^2$
Regression	1336.244	12	111.354	6.263*	0.000	0.670
Residual	657.836	37	17.779			
Total	1994.080	49				

* $P < 0.01$

The 'F' score in the table is 6.263, which is significant at 0.01 level of confidence. It reflects that there is significant relation between job stress dimension and job attitude in case of doctors. The following table shows regression coefficient between job stress dimension and job attitude.

Table No. 10 : Regression Coefficients – For the Occupation of Managers in manufacturing organizations

Dependent variable– Job Attitude.

Independent variable (Job Stress dimensions)	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constants)	74.043	8.414		8.800	0.000
Role overload	-0.122	0.273	-0.073	-0.448	0.657
Role Ambiguity	-7.30E-02	0.496	-0.025	-0.147	0.884
Role Conflict	0.170	0.365	0.065	0.465	0.644
Unreasonable group	0.559	0.474	0.167	1.179	0.246
Responsibility for persons	-0.103	0.534	-0.027	-0.192	0.849
Under participation	-0.611	0.596	-0.223	-1.025	0.312
Powerlessness	1.063E-02	0.618	0.003	0.017	0.986
Poor Peer Relations	-0.213	0.443	-0.067	-0.480	0.634
Intrinsic Impoverishment	01.333	0.553	-0.405	-2.547*	0.010
Low Status	-0.475	0.776	-0.123	-0.612	0.545
Strenuous Working Conditions	-0.669	0.539	-0.226	-1.242	0.222
Un profitability	0.704	0.580	0.150	1.213	0.223

* $P < 0.01$

The further analysis of job stress dimensions with job attitude shows that intrinsic impoverishment dimension of job stress is significant and negatively correlated with job attitude. It shows that intrinsic impoverishment component of job stress leads more stress to the managers, which results in negative job attitude. It indicates that job stress has an impact on job attitude.

Table No. 11 : ANOVA – Job Attitude and Job Stress for the Occupation of Managers in manufacturing organizations

Model	Sum of Squares	df	Mean square	F	Sig.	$R.^2$
Regression	1567.505	12	130.625	5.484	0.000	0.640
Residual	881.375	37	23.821			
Total	2448.880	49				

* $P < 0.01$

the 'F' score in the table is 5.484, which is significant at 0.01 level of confidence. It indicates that there is significant relation between job stress dimensions and job attitude among the managers in manufacturing organization. The following table shows the regression coefficient between job stress dimensions and job attitude.

Table No. 12 : Regression Coefficients – For the Occupation of Policemen

Dependent variable – Job Attitude.

Independent variable (Job Stress dimensions)	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constants)	116.026	18.993		6.109	0.000
Role overload	0.340	0.434	0.125	0.783	0.439
Role Ambiguity	0.531	0.171	0.131	0.740	0.464
Role Conflict	-1.226	0.522	-0.355	-2.347**	0.024
Unreasonable group	-0.917	0.423	-0.303	-2.168**	0.037
Responsibility for persons	-0.451	0.647	-0.081	-0.697	0.490
Under participation	-0.445	0.845	-0.099	-0.526	0.602
Powerlessness	-1.061	0.791	-0.180	-1.342	0.188
Poor Peer Relations	-1.120	0.519	-0.321	-2.158**	0.037
Intrinsic Impoverishment	-0.787	0.702	-0.203	-1.121	0.270
Low Status	0.377	0.939	0.082	0.402	0.690
Strenuous Working Conditions	-0.232	0.602	-0.066	-0.386	0.702
Un profitability	-0.892	0.925	-0.131	-0.965	0.341

** $P < 0.05$

The analysis in the table shows that role conflict, unreasonable group and poor peer relations these components of job stress are significant. These are negatively correlated with job attitude. It reveals that policemen experiences more job stress due to role conflict, unreasonable group and poor peer relations dimension of job stress. It results in negative job attitude among policemen. It reflects that job stress has an impact on job attitude.

Table No. 13 : ANOVA – Job Attitude and Job Stress for the Occupation of Policemen

Model	Sum of Squares	df	Mean square	F	Sig.	$R.^2$
Regression	3224.603	12	268.717	4.802	0.000	0.609
Residual	2070.517	37	55.960			
Total	5295.120	49				

* $P < 0.01$

The obtained 'F' value in the table is 4.802, which is significant at 0.01 level of confidence. It indicates that there is significant relation between job attitude and job stress in case of policemen.

Table No. 14Regression Coefficients – For the Occupation of System Managers

Dependent variable – Job Attitude.

Independent variable (Job Stress dimensions)	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constants)	85.907	6.908		12.436	0.000
Role overload	0.125	0.197	0.083	0.637	0.528
Role Ambiguity	-0.544	0.327	-0.229	-1.663	0.105
Role Conflict	-0.517	0.324	-0.238	-1.596	0.119
Unreasonable group	0.208	0.359	0.071	0.579	0.566
Responsibility for persons	0.142	0.363	0.050	0.391	0.698
Under participation	-0.700	0.296	-0.347	-2.365**	0.023
Powerlessness	-0.542	0.367	-0.192	-1.477	0.148
Poor Peer Relations	-1.059	0.348	-0.443	-3.043*	0.004
Intrinsic Impoverishment	-4.74E-02	0.346	-0.020	-0.137	0.892
Low Status	0.721	0.479	0.193	1.505	0.141
Strenuous Working Conditions	-0.950	0.308	-0.409	-3.089*	0.004
Un profitability	0.397	0.409	0.111	0.971	0.338

* $P < 0.01$ ** $P < 0.05$

The regression coefficient analysis reveals that under participation, poor peer relations and strenuous working conditions; these dimensions of job stress are significant. These dimensions are negatively correlated with job attitude. Due to these dimension of job stress system managers' experiences more job stress, which interns in negative job attitude. It shows that job stress has an impact on job attitude.

Table No. 15 : ANOVA – Job Attitude and Job Stress for the Occupation of System Managers

Model	Sum of Squares	df	Mean square	F	Sig.	$R.^2$
Regression	114.716	12	92.893	7.583	0.000	0.711
Residual	453.284	37	12.251			
Total	1568.000	49				

* $P < 0.01$

The 'F' value in the table is 7.583, which is significant at 0.01 level of significance. It reveals that there is significant relation between job stress and job attitude in case of system managers.

Table No. 16 : Regression Coefficients – For the Occupation of Journalists

Dependent variable – Job Attitude.

Independent variable (Job Stress dimensions)	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
(Constants)	87.621	11.755		7.454	0.000
Role overload	-0.147	0.257	-0.072	-0.574	0.569
Role Ambiguity	-0.321	0.545	-0.109	-0.588	0.560
Role Conflict	-0.302	0.340	-0.127	-0.887	0.381
Unreasonable group	0.567	0.359	0.221	1.581	0.122
Responsibility for persons	0.211	0.501	0.058	0.421	0.676
Under participation	-1.156	0.381	-0.408	-3.032*	0.004
Powerlessness	-0.110	0.668	-0.024	-0.165	0.870
Poor Peer Relations	-0.644	0.365	-0.254	-1.765***	0.086
Intrinsic Impoverishment	-0.575	0.612	-0.151	-0.940	0.353
Low Status	-0.414	0.623	-0.090	-0.665	0.510
Strenuous Working Conditions	-0.147	0.597	-0.028	-0.245	0.808
Un profitability	-4.00E-02	0.598	-0.010	-0.067	0.947

* $P < 0.01$ *** $P < 0.1$

The further analysis reveals that under participation and poor peer relations components of job stress are significant and negatively correlated with job attitude. These dimensions of job stress causes more stress to the journalists, which results in negative job attitude. It indicates that job stress has an impact on job attitude.

Table No. 17 : ANOVA – Job Attitude and Job Stress for the Occupation of Journalists

Model	Sum of Squares	df	Mean square	F	Sig.	$R.^2$
Regression	2371.774	12	197.648	5.256*	0.000	0.630
Residual	1391.446	37	37.607			
Total	3763.220	49				

* $P < 0.01$

The 'F' score in the table is 5.256, which is significant at 0.01 level of confidence. It shows that there is significant relation between job stress and job attitude among the journalists. The following table shows the regression coefficient between job stress and job attitude.

Table No. 18 : Age- wise analysis of job stress and job attitude (N=400)

		Job Stress		Job Attitude	
AGE GROUP	N	Mean	S.D.	Mean	S.D.
Up to 35 years	263	129.06	16.64	53.36	7.85
Between 35 years and 50 years	268	123.02	19.56	53.48	7.82
Above 50 years	138	117.40	18.33	54.45	7.14

The job stresses of the employees, who are in the age group of up to 35 years, have the mean value 129.06. The employees between the age 35 years and 50 years have the mean value 123.02. The employees who are above 50 years age have the mean value 117.40. Thus the age increases stress comes down.

The mean value of job stress of the employees decreases as the age of employees' increases. It reveals that as age increases the level of job stress comes down. It may be because of the experience in the job and psychological settlement in the job.

Employees take some time to settle psychologically in the job. The job characteristics, situational variables at work place, relation with staff members may cause stress to the employees in the years of initial employment. The affectivity and cognitivity may be the cause for low job attitude in the first age group

As the stress comes down in the second and third age range it may be the signal of psychological settlement in the job, coping and / or managing with the job characteristics and situational variables. It ultimately increases job attitude. The job attitudes of the employees, which are in the age group up to 35 years, have mean value 53.36. The employees, who are in the age group of 35 years to 50 years, have mean

value 53.48. The age groups of the employees above 50 years have mean value 54.45.

The mean values of different age group of employees regarding job attitude shows increasing trend. It indicates that as the age of employees' increases the attitude of the employees towards their job turns in positive direction.

The age- wise analysis of job attitude projected a change in attitude towards positive direction as the age increases as well as stress comes down.

9. Correlation between Job Stress and Job Attitude

Further analysis related to finding out job stress and job attitude correlations. The coefficient of correlation is a measure that describes the relationship of one variable with another. Therefore, an attempt has been made to study the relation between job stress and job attitude with the help of correlation. The following table shows the correlation between job stress and job attitude.

Table No.19 : Correlation between job stress and job attitude

VARIABLES	JOB ATTITUDE	JOB STRESS
Job attitude Pearson correlation Sig.(2-tailed) N	1.000 669	
Job stress Pearson correlation Sig.(2-tailed) N	- 0.617** 0.000 669	1.000 -- 669

** P<0.01

All the correlations between job stress and job are significant. The obtained values are significant at 0.01 level of confidence. It reveals that there is a relation between job stress and job attitude

It shows that there is a significant relation between job stress and job attitude. The coefficient of correlation between job stress and job attitude is – 0.617, which is significant at 0.01 level of significance. It indicates that there is a correlation between job stress and job attitude. It confirms that higher the job stress level, negative the job attitude of the employee. Lower the job stress level positive the job attitude of the employee.

Thus from the above analysis the hypothesis that, there is a relation between job stress and job attitude accepted.

Second hypothesis is that there is an impact of job stress on job attitude. The regression between job stress and job attitude for different occupations shows that there is impact of job stress on job attitude. Higher the stress, negative the job attitude and lower the stress positive the job attitude.

10. Conclusion and Job Implications

Job stress is widely accepted phenomenon and it differs from job to job. According to the present study policemen and managers in manufacturing organizations have more stress as compared to the other occupations in the study. The result reflects basic assumption of the study reflecting stress variation among different

occupations. The result reflects basic assumption that certain jobs have more stress.

Similarly job attitude also differs among different occupations. Job stress has got an impact on job attitude and it has been reflected in all the eight occupations considered for the study. It means that job stress will influence job attitude reflecting poor performance. The study agrees with the study conducted earlier researcher George (1990), Bruke, Brief and George (1993).

Thus Stress variation found between different jobs. The study also attributes the relation between job stress and job attitude. This factor should be considered especially by the HR managers while practicing in their organizations. Therefore, HR managers should take utmost care in reducing stress environment

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CASE STUDY

The Landscape Resorts Limited (A)

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Landscape resorts limited is a chain of five star and seven star hotels in India. The group hotels are present in most of the locations in India and have gained a market position for the customer experience and the service provided by them.

The customers may be classified as the Individual customers, Corporate customers, Travel agents, and Charter agents. Since its inception the company has strived hard by designing policies and structures to gain customer loyalty and it has been successful to a great extent. Landscape Resorts Limited has two properties in Kerala, one in North Kerala and one in South Kerala. Sources claim that 36% of the customers visiting the Kerala properties are repeat customers. They largely comprise of empty nesters and small families. It is interesting that people perceive landscape resorts' Kerala properties as their second home and hence they are enchanted to celebrate special occasions like anniversaries, birthdays, success parties etc.

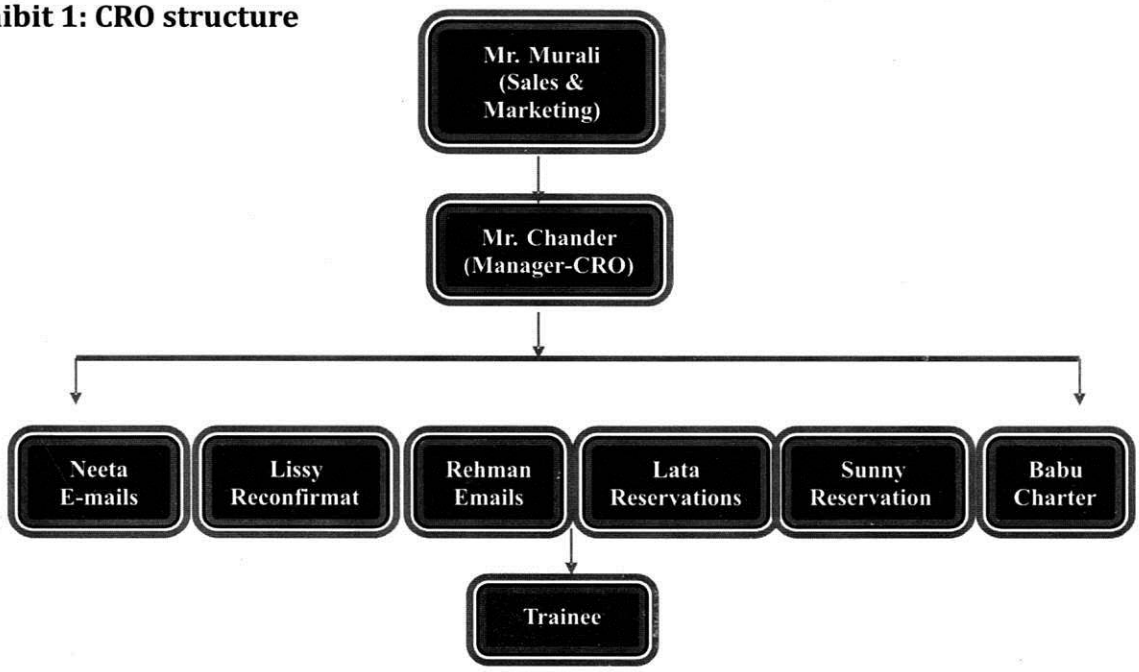
All these factors associated with the resort makes it even more important for the management that the customer is delighted and willingly continues the patronage.

The Central Reservation Office (CRO)

The central reservations office of Landscape resorts Ltd, CRO is a well designed and staffed office situated in the North Kerala property of the group. It handles the bookings for both the properties of the group in Kerala. The CRO is an interface between the customer and the Hotel. It is also responsible for coordinating with the national reservation call centre and takes care of all the reservations that are routed from there.

This case was prepared by Prof. Barnabas N., NMIMS University Bangalore Campus and Prof. Nandakumar Mekoth, Department of Management Studies, Goa University as instructional material for class room discussion.

Exhibit 1: CRO structure



Job descriptions of the Customer Interacting Employees of the CRO:

Emails: - responsible to check and respond back to all the emails received directly from the customers and the one forwarded by the National reservation call centre situated in Mumbai and Chennai.

Reconfirmation: reconfirm the bookings to avoid last minute cancellations, send reminder calls and emails, accept the payment details, and cancel the reservation if payments not received before the cut off date.

Reservations: answer to all the phone calls made by the customers for reservations, query, and special requests.

Charter: coordinating with the charter agents, for the purpose of reservations customer details & specifications, payment details, special queries, and follow up with the agents etc.

CRO Crisis:-

As evident from the structure (Exhibit 1) the responsibility to attend the phone calls was bestowed upon the reservation officers. On an average the resort received more than 35 calls with average time of 8 minutes per call. It was also observed that most of the calls were between, 11.00 hours to 13.00 hours and then 15.30 hours to 17.00 hours. As a policy matter the customers are asked to fill the feedback form, where their opinions on various aspects are invited. It was through these forms that the management realized that customers had problems with reference to the waiting time in CRO. The same was then informed to the CRO manager.

What should the CRO Manager do and why?

The Landscape Resorts Limited (B)
Fact Finding

- The CRO manager personally visited the major travel agents (company associates) and sought their opinion, it was surprising but almost all of them complained that their calls were not attended at once, at times they had to call more than twice but still they were not received.
- One of the travel agents, to prove his point, made a call to the CRO office in front of the CRO manager and the outcome of the call was no surprise for the travel agent.
- Couple of agents even confirmed that because of delay in attending calls, which is very frustrating, and hindrance to their business functioning, they rate landscape resorts on fourth rank and prefers other competitors.
- It was then realised by CRO manager that the delay in attending the phone calls a major issue needs to be handled with immediate care.
- To be more ensured for the next three weeks he made some dummy calls , and the outcome was;

Exhibit 2

Out of the 50 calls made

5 calls were attended in 2-3 rings

12 calls were attended 4 to 5 rings

19 calls were attended in 6 -8 rings,

6 calls were received after more than 8 rings

8 calls were not received at all

Once convinced of the gravity of the issue the CRO manager thought of possible measures to address the problem. The first alternative that he thought was to increase the staffing and get one more person. However the General manger did not accept the alternative because it would have increased their yearly cost by another Rs.1 lakh rupee. Secondly there were space constraints in the CRO and there were no alternate premises available.

The issue was referred to senior managers as it was evident that there were similar issues with some other properties and CROs. Hence the company introduced a new policy of "3 Rings" wherein it was necessary that all the calls are received and attended within 3rd ring and the CRO manger along with the sales and marketing manager was made in-charge of implementing the same in the Kerala property.

One of the co-workers at CRO also quoted that "*reservations officers don't take their work seriously*". When investigated it was observed that in total there were *five local women* working

in the CRO, and they spend most of their time in chatting, however the reconfirmation officer, Emails head, Reservation officer for charters, their workload was evenly distributed and involved a lot of non-talking work as a reason they could manage their tasks well, however the reservations officer often delayed in answering the phone calls that made a bad image for the CRO.

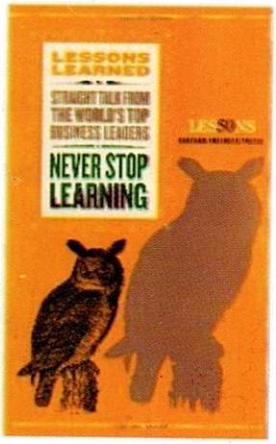
What should the CRO Manager do and why?

The Landscape Resorts Limited (C)

The Solution

- As the first measure it was decided to change the sitting arrangement. The two reservation officers were made to sit in-front of the CRO manager's desk so that they can be continuously monitored. However, within a week's time the manager realised that he was judgemental about the inefficiency of the two reservation officers and hence they decided to go for a structural change.
- Till date everyone at CRO was doing specific tasks. Calls were handled by only two officers. In-order to implement the three ring policy of the company, work responsibilities was re-assigned. All the six CRO officers were made responsible to attend calls and the changed scenario was explained through a workshop.
- As per the new system, the two reservation officers were mainly in-charge to answer the calls. If they were busy attending calls, then the new call got transferred to one of the remaining officers and they need to answer the same.
- Fast Reservation was made a team responsibility activity and all the members of the CRO were entrusted with the responsibility. Further, to reduce the call timings and hold timings, FAQ replies were pasted on the office walls that helped the officers to make quick references to support customers over phones with the necessary information.
- As a controlling practice the CRO manager along with other executives regularly interacted with the travel agents to see the efficiency of reservation operations. The feedback was shared with the CRO employees.

Critically evaluate the measures Implemented by the CRO Manager.



Never Stop Learning: Straight Talk from the World's Top Business Leaders

(Boston: Harvard Business School Press, 2010),
Lessons Learned Series,
pp. 95, (p/b), U.S. $ 9.95,
ISBN 978-1-4221-3990-5

In the foreword to this anthology of essays, Jeanne C. Meister argues that corporate learning is going to be an increasingly important source of competitive advantage in the years to come. And, as Meister correctly points out, these essays will give readers an opportunity to understand how "practitioners are reinventing, reimagining, and rethinking corporate learning". What does the term "corporate learning" mean here? Meister is not using the term as a synonym for organizational learning since there are more organizations in the world than corporates; so, by logical implication, we can infer that corporate learning is an important subset of organizational learning. And, then again, the levels, interest, and pace of learning of a set of executives who belong to the same corporate will not be the same. It is therefore important to differentiate clearly between what organizations know, what corporates know, and what executives know. What is known in these different loci furthermore is not the same as what is learnt from these loci. The overwhelming need that is being addressed in books such as this is for action learning which should be collaborative, engaging, innovative, mobile, and even wearable. These then are the terms that Meister identifies as the key attributes of action learning. Those who design learning programs will gain by keeping these attributes in mind while doing so. Traditional models of education and learning may find it difficult to come to terms with these new modes of learning, but must remember that it is possible to harness new forms of recreational devices and social networking technologies. And so, as Meister puts it, "the workplace of iPhones, iPads, video games, business simulations, and corporate social networks will change forever how and where we learn. Our job is to ensure we never stop learning".

It is however a good idea to understand what the default model of learning is in order to envisage what new approaches are possible. Dan Parisi of BTS argues that most educational institutions in the Western world were content to use the model of teaching and learning that was used in medieval monasteries; this is the "lecture and scribe method". Here an abbot would read out from an ancient manuscript and the monks present would transcribe a copy for themselves. This is not so much a pedagogical method; it is more of a problem created by lack of sufficient learning material. Producing such learning material so that each of the monks gets a copy of the study material by personally transcribing what was being read aloud or the phenomena that were being described in the form of a lecture becomes the be-all and end-all of education. There was, according to Parisi, no break-through in teaching methods until Christopher Columbus Langdell introduced the case method at Harvard Law School in 1890. Variations of this method were then taken up by the different professional schools at Harvard and elsewhere,

but only after a lot or resistance had to be overcome at Harvard itself from the traditionalists. Parisi is probably hinting in passing that the transition from the traditional approach to case teaching, which is now well-entrenched in professional schools to the more "visceral" forms of learning like business simulations will throw up analogous challenges for professional educators in the near future. What Parisi is advocating then is the need to develop experiential forms of learning that will include both intellectual and visceral approaches to learning by combining the case method with business simulations especially in corporate universities and managerial development programs in order to make the training program as relevant as possible. Likewise, Karen Kochner of the CIGNA Corporation argues that it is possible to incentivize learning programs in the domain of health by interpellating potential learners through social networking strategies. This is a productive way of engaging and communicating both with internal and external audiences; there is also a high probability that given the right set of incentives, these audiences will change their health behaviors for the better.

While experiential learning is the way ahead, it is important to be tactful while offering such programs. So, for instance, Karie Willyerd of Sun Microsystems argues that the best way to train top executives is to give them an opportunity to play a game such as "run-the-company-for-a-week". The advantage of doing so is that it will make it possible to align the learning process of top executives with the strategic direction and goals of the firm. Adults learn best through mutual interaction and sharing of experiences rather than through routine rote-learning in the form of lectures. Tactical approaches to learning that are anchored through work experiences will carry more conviction in terms of their eventual applicability. The use of training games and business simulations will take care of the residual stigma that adult learning programs still connote for many people who have not yet bought into the ethic of life-long learning and associate the process of learning with their time in school and college. For Willyerd, then, the question that has served to provide pedagogical direction as the Chief Learning Officer of Sun Microsystems, especially in the context of requests for new training programs, is simply this: "how do I align this to strategy?" The significance of this question relates to the need to quicken the pace of both learning and implementation by finding "ways to align learning initiatives with business strategy". The best way to do so as Wendell C. King, the Dean of Academics, U.S. Army Command, points out, is by identifying and adopting "innovative learning tools". King argues that there is immense learning and training potential in internet communities where Army officers set up sites such as the "company-commander.com as a community of practice". Specialized sub-communities of practice then were set up to help members of the armed forces who were focused on particular types of jobs. What these communities spontaneously addressed were gaps in the traditional approaches to teaching. The takeaway for King is that it is important to go beyond the "Army schoolhouse system", and foster supplementary approaches to learning through net-based communities of practice. If however these communities are integrated with the systems already in place, then, the pace of learning may be even more satisfactory. The learning contexts that King is invoking here include training programs conducted by the U.S. Army Command and the General Staff College.

Not only are the levels and patterns of interaction in online and offline communities increasingly complex, even the ontological distinction between these communities is getting blurred. As Marilyn Carlson Nelson, of the Carlson Companies, argues, it is not easy to learn from offline experiments and take the learning forward into the next set of business transactions as used to be the case earlier since off-line activities are nowadays discussed routinely by on-line communities. This blurring of lines and the complex forms of interaction between these communities is demanding new forms of executive training, which will involve developing new types of cases, games, and simulations. Carlson is also

asking for business school cases to be discussed and examined by faculty and case discussants in a range of professional schools in order to set out the significance of the varying levels of semantic over-determination from a multi-disciplinary point of view. Such an approach will tease out a range of socio-economic and environmental implications that are not reducible to a mere calculation of "return on equity", as is often the case, in business schools. She invokes the example of the Carlson School of Business at Minnesota where faculty and case discussants work across cultures and geographies to make their training programs relevant in a number of industries. Analogously, it is important in employee socialization to have new employees work across a range of organizational silos so that they are able to appreciate the opportunities and constraints across different functions. Carlson is using such cross-training approaches both in the context of management education and industrial training programs effectively as a crucial differentiator of its offerings. This preoccupation with corporate learning and training programs is taken up again in the last three essays of this book, but a number of essays that precede these are about the behavioral pre-requisites of individual learning. While these essays have a number of interesting insights on offer, the relationship between individual learning strategies and organizational learning strategies and the forms of alignment that determines their relationship to a firm's value chain could have been explained with greater clarity in terms of the book's editorial strategy, which is not made sufficiently explicit since there is no named editor from HBS Press who can give it a specific direction.

A simple instance of the relationship between individual learning and performance *vis-à-vis* organizational learning and performance emerges in the context of the differences between the approaches of successful salesmen and successful sales executives; the former is selling a product or service, but the latter is selling the team. It takes a certain amount of work experience to understand the affective difference between these approaches. This is the essence of the takeaway in an essay by Andris Zolters of the Kellogg School of Management. He therefore argues that determining the degree of 'job-fit' is about matching opportunities to the skill-sets available and not a reward for past performance since a different set of skills may be necessary to succeed in a future assignment. Not everybody who does well is necessarily aware of their own strengths and weaknesses. Bob Cancalosi of GE Healthcare, for instance, noticed that when an employee made a formal presentation, he was often not even aware of whether he physically moved about much in the room during the presentation. If the level of self-awareness is so low in terms of physical movements, the less said about thought processes the better since most are condemned to remain unconscious. How then will trainers help to cultivate the ethic of self-awareness in leadership training workshops? Whatever they do must be mediated with enormous tact and caution and they must intervene only in the best interests of their respective trainees. Myles Downey, an expert on coaching, explains that the inhibitions experienced during a performance are often self-imposed, but there is an organizational element as well given the need for control. In order to spot and remove inhibitions on performance, however, leaders in supervisory positions must not only identify unused potential but also the moments when employees keep "getting in their own way". And, needless to say, a person will get his own way only when he stops getting in his own way. This is often the case in setting an effective learning agenda in "workshops and conferences", where, as Victor Newman of KnowledgeWorks points out, it is possible to learn actively rather than sink in the stupor that is induced by pre-set presentations that are not sufficiently customized to the needs of a particular audience. Newman's interest in advocating activist approaches to learning and the specific set of techniques that he has developed are listed in this book but not discussed at length. These techniques however should make it possible for those enrolled in training workshops to co-design such training programs. The great challenge in the deployment of such activist techniques is whether it will get an executive out his comfort zone to try out something new. Nick Adamo of

Cisco Systems, for instance, argues that multidimensional growth even within a specific vertical presupposes a willingness to try new things without worrying too much about "scar tissue", i.e. the wounds of previous battles. Moving both vertically and horizontally in terms of career paths is important to invigorate employees and give them a sense of professional well-being. The scar tissue problem however requires the maturity to learn from the past and move on. Domenico De Sole of The Gucci Group therefore argues that it is important to differentiate between mistakes at the level of the individual and those at the level of the system. Focusing on the latter will make it more likely that employees will proactively report mistakes in order to create better organizational routines and processes.

And, finally, the essays return to the original theme which is the need "to align corporate learning with strategy". Terry Kristiansen of Toshiba America cites an instance where they had to put together "an action learning team in place" from a cross-functional perspective. Not only were the presentations made by such teams successful, but such teams were perceived to have "the potential to understand business issues, investigate them, determine solutions, and deliver long-term results". What is required to make such results possible then is not a definition of learning as a discrete event, but rather as a continual process. The task that Jason Zeman of Watson University sets himself is to visualize what such programs will be like through the use of virtual classrooms by using, for instance, the iPhone through which trainees can access pod casts on a range of subjects. The use of the iPhone as a learning device is a simple but effective way of removing inhibitions that prevent learning in actual classroom situations. By making small but continual investments in pod casts, trainees begin to understand "how easy it is to continuously develop themselves" through the combination of both easy-to-use devices like the iPod and learning platforms like computers; getting these devices and platforms into harmony means that the learning chain has to be "streamlined" effectively. By doing so, it is possible to give end-users many more options in terms of what, how, and where they will learn. They will also be able, as George Wolfe of Steelcase Inc points out, to find a way to "transfer learning into performance" by providing "just-in-time" learning to a "multigenerational workplace". This, in a sense, is the main agenda of a corporate learning program which, unlike research-based academic programs, is not a disinterested pursuit of knowledge and learning in itself. Wolfe argues that it is also a good idea to work with internal "performance consultants" within the context of a corporate university. These performance consultants will be able to determine to what extent performance expectations are being met and how high the performance standards should be set for a hypothetical employee in a given domain so that the firm as whole can meet the expectations of its stakeholders. A specific instance of the development of a tool that will facilitate this process is "the Gilbert's Grid", which will not only situate expectations of the employees, but list constraints, contingencies, and so on that can affect the performance of the firm and suggest solutions in a timely fashion. The wager in such tools is to "get this right *upstream*" before the launch, for instance, of a new product or service. It is also possible to identify the relevant stakeholders for any given performance initiative in order to get their acceptance, understanding, and buy-in at the earliest. Learning then can be leveraged into successful organizational performance only if certain processes are in place. What essayists in books like this are trying to identify are precisely those processes so that the process of learning can be a source of competitive advantage and source of self-esteem for employees in the knowledge-based era.

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Cummins, Thomas G. & Huse, Edger E. (1998) Organisational Development and Change. West Publishing Company, St. Paul, New York.

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