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ANALYSIS OF MALAYSIAN YOUNG ADULTS' ATTITUDES TOWARDS PIRATED PRODUCTS.

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ABSTRACT

The costs of product piracy towards knowledge creation and innovation are enormous. It hampers the development of knowledge and innovation because piracy can greatly reduce the economic benefits for the original creators of products and ideas. Widespread piracy and weak intellectual property regulations and enforcement, particularly in developing countries, will undermine development and the growth of local industry, and threaten local knowledge. In terms of the business enviornment, this can lead to loss of competive advantage because the measure of competitiveness among firms is driven by the firm's ability to innovate and create new types of economic assets built from knowledge capital. If piracy is widespread, businesses are de-motivated to invest in R&D of new products/services since it will be difficult to recoup the high cost of these investments. Thus, the aim of this study is to analyse the consumer's attitude in purchasing pirated products and their purchase intention. The finding of this research could help organizations in understanding piracy issues and consequently, enable them to have better knowledge in the formulation of anti-piracy strategies. Malaysian public universities' students were used as sample since they constitute an important market segment of generation Y, that is, an emerging generation with powerful aggregated spending. The findings confirmed that novelty seeking factors have a significant influence on the tendency to buy pirated goods. The implications of this study and directions for future research are also discussed.

Keyword: *product piracy, intellectual properties, consumer attitudes, anti-piracy strategies, Malaysia*

1.0 INTRODUCTION

Pirated product refers to copied item, but they are produced with the knowledge that the consumer will be aware that the item is pirated, so it will usually sold at lower price (Lai and Zaichkowsky, 1998; McDonald and Roberts, 1994; Wee *et al.*, 1995). Piracy or counterfeiting is a serious matter that affects not only high branded products such as clothing and accessories but also products which involve a high level of R&D

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such as software, pharmaceuticals, aircraft parts, etc., (Wee *et al.*, 1995; Bush *et al.*, 1989; Phau and Prendergast, 1998). Products with high-status logos such as software, audio and video compact discs are especially prone to product piracy (Prendergast *et al.*, 2002). In this study, the focus is on optical discs piracy such as compact discs (CD), video compact discs (VCD), digital video discs (DVD) and computer software.

Asia countries, including Malaysia, are considered as the world's worst violator of intellectual property rights (Phau & Prendergast, 1998, Patrick, 2005). For instance, from April 1999 to June 2005 there are 34,529 cases of piracy in Malaysia (Ministry of Consumers Affair and Domestic Trade, 2006). Despite the seriousness of the problem, there are limited researches, particularly in the area of understanding the Malaysian attitude towards piracy. Previous researches had been conducted in countries like China, Singapore, Hong Kong, Shanghai, USA, (Ang *et., al* 2001; Wang *et., al* 2005; Moores and Dhillon, 2000; Swinyard *et., al* 1990). These researches results may help to understand consumer's attitude towards piracy but it cannot substitute for research on Malaysian consumers. Different social values, culture, regulations and business environment in the Malaysian context may have an impact on the research finding. Furthermore, to design effective piracy protection strategies, analysing the rationale and motivation behind the demand is important (Bloch *et al.*, 1993; McDonald and Roberts, 1994). Lastly, university students were used as sample in this study because they constitute an emerging generation (Generation Y between 19-26 years old) with powerful aggregated spending (Cui *et al.*, 2003), optical disk and other high-tech products' users (Tapscott, 1998) that also have been identified as a user group of pirated products (Cheng *et al.*, 1997).

2.0 LITERATURE REVIEW

2.1 Consumer's attitude toward piracy

Attitude is a learned predisposition, to behave in a consistently favorable/unfavorable manner towards a given object (Schiffman and Kanuk, 2004). As a learned predisposition, attitude might influence a consumer toward, or push a consumer away, from a particular behavior (Schiffman and Kanuk, 2004). Thus, if a consumer has a favorable attitude toward piracy, it will influence the consumer to buy pirated products and vice versa.

Social Influences: Social influences have a major influence on consumer's decision making (Schiffman and Kanuk, 2004). Consumers' attitudes can be influenced by social pressure depending on their susceptibility level. Consumer susceptibility is "the need to identify with or enhance one's image in the opinion of significant others through the acquisition and used of product and brands, the willingness to obey the rules to the expectations of others regarding purchase decision, and the tendency to learn about products by observing others or seeking information from others"

(Bearden *et al.*, 1989). There are two form of susceptibility; informative and normative susceptibility (Bearden *et al.*, 1998). Informative susceptibility is consumer susceptibility to social influence, it concerns purchase decisions based on the expert opinions or others (Wang *et al.*, 2005). Information susceptibility usually occurs when consumers are not knowledgeable of the product category (Ang *et al.*, 2001). Normative susceptibility concerns purchase decisions based on the expectation of what would impress others (Ang *et al.*, 2001). It differs from informative susceptibility in the sense that normative susceptibility is expected to have a negative outcome on attitude towards pirated product. Buying fake products will bring a bad impression from others, thus people with high normative susceptibility will have a negative attitude towards piracy.

Personality Influences: Personality can be defined as those inner psychological characteristic that determine and reflect how one's responds towards the environment (Schiffman and Kanuk, 2004). Among the factors that influence personality are value consciousness, personal gratification, and novelty seeking. A value consciousness consumer is a person who will look for a product that they will only pay at a lower price subject to some quality constraints (Ang *et al.*, 2001; Lichtenstein *et al.*, 1993). In economics perspective, when price goes down, demand will rise. Pirated products provide great cost saving to consumers; although some compromise in quality, the perceived value is high (Dodge *et al.*, 1996). Previous research had proved that when a counterfeit has a distinct price advantage over the legitimate product, consumers will choose the fake products (Bloch *et al.*, 1993). It is predicted that a person who has more value consciousness will have positive attitudes towards piracy compare to less value consciousness.

Personal gratification concerns the need for a sense of accomplishment, social recognition, and to enjoy the finer things in life (Ang *et al.*, 2001 and Wang *et al.*, 2005). Consumers with low personal gratification will value the pirated version of products more than the genuine product. Personal gratification is not important for a person who values pirated products. Thus it is predicted that a person who has less personal gratification will have more favourable attitudes towards piracy.

Novelty seeking refers to the human interest in looking for variety/differences (Hawkins *et al.*, 1980). It may arise out of consumers' dissatisfaction with product attributes, or with the brand they frequently repurchase, particularly for products with low purchase risk (Jeuland, 1978; McAlister and Pessemier, 1982). Thus novelty seeker are more likely to purchase pirated products as these are low cost means of satisfying their curiosity and need of experimentation towards certain things (Wee *et al.*, 1995) for example video games software and movie recording. It is predicted that a person who has a high novelty seeking level will have more favourable attitudes

towards piracy.

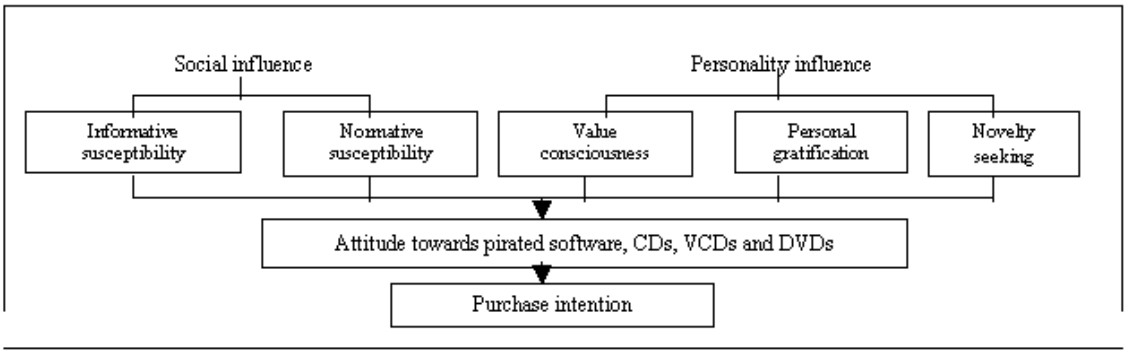
2.2 Purchase Intention

Purchase intention is a cognitive component in attitude. It is concerned with the tendency of an individual with regard to the attitude towards an object (Schiffman and Kanuk, 2004). Purchase intention is routinely used for purposes such as tracking products in a market (McNeil, 1974) and product testing (Silk and Urban, 1978). Purchase intention may provide better forecasts compared to past sales trend analysis (Armstrong *et., al,* 2000). Thus, understanding consumer purchase intention in purchasing pirated optical discs is important in designing effective prevention strategy towards piracy. Based on Figure 1 of conceptual framework of this research, attitudes toward piracy is the destination construct.

3.0 CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESES

The framework is adapted and modified from Ang *et al.*, (2001) and Wang *et al.*, (2005). It examined the factors that influence consumers' attitude towards piracy and relationship between consumer's attitudes and purchase intention.

Figure 1. A model of consumer response in purchasing pirated optical discs



Sources: Adapted from Ang *et al.* (2001); and Wang *et al.* (2005).

The framework is used as a guidance to formulate and test the hypotheses below:

H1: Information susceptibility has negative effect on attitudes toward piracy.

H2: Normative susceptibility has negative effect on attitudes toward piracy

H3: Value consciousness has positive effect on attitude towards piracy.

H4: Personal gratification has negative effect on attitude towards piracy

H5: Novelty seeking has positive effect on attitude toward piracy.

H6: Consumers attitude toward piracy will leads to their purchase intention.

4.0 METHODOLOGY

The population for this study was undergraduate students of Malaysian public universities, in order to examine their attitude towards pirated optical discs. Five

public universities in Malaysia agreed to participate in this study. Based on Luck et al (1987)'s formula, minimum sample size is identified at 400. Research assistants were used to distribute a total of 400 questionnaires, and respondents in this research were selected through convenience sampling. The instrument used was a pilot-tested questionnaire method adapted from the work of Wang *et al.,* 2005; Ang *et al.,* 2001 and Wee *et al.,* 1995. The questionnaire consist of three parts; part A looked at the respondents' demographic information; part B measured respondent's attitude towards optical discs piracy and part C measured respondent's social and personal characteristic. Alpha value for the variables in the questionnaire ranges above 0.8 and therefore it is considered reliable and valid.

5.0 FINDINGS

Out of 400 questionnaires that were distributed to the students, 367 usable questionnaires were returned (97% response rate). The respondents' demographic characteristics are presented in Table 1. As shown in the table, there were 106 male and 261 female respondents. This unbalance situation happened because there were twice as many female university students compared to male students. Most of the respondents' age ranged between 19 to 24 years old. Majority of the undergraduate students were single and most of respondent's sources of allowance were from the Malaysia's National Higher Education Fund Corporation (known as Perbadanan Tabung Pendidikan Tinggi Nasional) that consisted of 55.3%, while from family 37.3%. Besides that 5.4% respondents were getting their monthly allowance from various other federal or states government agencies. 66.8% of respondents have an allowance of below RM500 per month. There were 4.6% of respondents who get their monthly allowance between RM1501 to RM2000. This is because either they were doing part time jobs or they got additional funding from family.

Table 1: Respondents' demographic characteristics (n=367)

Demographic characteristic		**Frequency**	**Percentage**
Gender	Male	106	28.9
	Female	261	71.1
Age	19 – 24 year old	332	90.5
	25 – 30 year old	31	8.4
	31 – 35 year old	2	0.6
	36 – 41 year old	2	0.5
Religion	Buddhism	48	13.1
	Christian	57	15.5
	Hinduism	28	7.6
	Islam	233	63.5
	Others	1	0.3

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Race	Chinese Iban Indian Malay Others	63 18 32 220 34	17.2 4.9 8.7 59.9 9.3
Marital status	Single Married Divorced Others	349 14 2 2	95.1 3.8 0.5 0.5
Source of income	Family PTPTN Own Saving Others	137 203 7 20	37.3 55.3 1.9 5.4
Monthly income	< RM500 RM501 – RM1,000 RM1001 – RM1500 RM1501 – RM2000 Others	245 58 15 17 32	66.8 15.8 4.1 4.6 8.7

5.1 Relationship between Social and Personality Factor and Attitude towards Optical Discs Piracy.

Factor analysis was done before regression analysis procedure was carried out. Under the dependent variables there is only one variable found to be the most important factor in influencing consumer's attitudes towards piracy. It is novelty seeking with Regression Coefficient, *B* values of 0.142 and accounted for R^2 of 0.025 (please refer to Table 2). While informative susceptibility, normative susceptibility, value consciousness and personal gratification are found not important in influencing consumer's attitude. Thus, novelty seeking has a positive effect on attitude toward piracy (H5), information susceptibility has negative effect on attitudes toward piracy (H1), normative susceptibility has negative effect on attitudes toward piracy (H2), and personal gratification has negative effect on attitude towards piracy (H4) are accepted and value consciousness has positive effect on attitude towards piracy (H3) is rejected. The research findings also show that value consciousness has a negative effect on consumer's attitude toward piracy. The results are consistent with past research done by Ang *et al.,* (2001) which stated that novelty seeking influences consumer's

attitudes towards piracy (H5) and information susceptibility and personal gratification has a negative effect on attitude towards piracy (H5 and H4). This study's finding is also consistent with Wang *et al.,* (2005) which found that novelty seeking does influence attitude towards piracy. But different from Wang *et al.,* (2005) study, value consciousness is not found as an important factor in influencing consumer's attitude (H3).

1-1-1-1- Table 2: Regression Result on Factor Influencing Attitude

Regression equation	*B* value	Standard error	Standardize regression coefficients	*t* value	Significance level
Novelty Seeking	0.142	0.046	0.159	3.076	0.002
Constant	-0.371	0.131		-2.827	0.005
Notes: R^2=.025, F= 9.459					

5.2 Relationship between Attitude towards Optical Discs Piracy and Purchase Intention.

In analysing the relationship between attitude and purchase intention, stepwise regression was used. The intention was to identify the most important measures in attitude towards optical discs piracy. Dependent variable is purchase intention and independent variables are ten measures of attitude construct. Table 3 shows that six independent variables accounted for adjusted R^2 of 0.238 of the purchasing intention of pirated optical discs. There are six measures that were identified as influencing purchase decision which is product similarity (0.137), social concern (0.175), perception (0.187), product reliability (0.125), legal judgement (-0.96) and product functionality (0.110). Those six measures were identified as factors in influencing consumers to purchase pirated optical discs. Consumers' attitude toward piracy will influence and lead their purchase intention (H6) is supported.

Table 3: Regression Result on Attitudinal Measures that Influence Purchasing Intention

Regression equation	*B* value	Standard error	Standardize regression coefficients	*t* value	Significance level
Product similarity	0.137	0.051	0.161	2.694	0.007
Social Concern	0.175	0.040	0.208	4.412	0.000
Perception	0.187	0.050	0.178	3.717	0.000
Product Reliability	0.125	0.053	0.141	2.344	0.020
Legal Judgment	-0.096	0.039	-0.114	-2.431	0.016
Product	0.110	0.047	0.126	2.339	0.020

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Functionality Constant Notes: R^2=.250, F= 20.047	-1.971	0.272		-7.255	0.000

6.0 DISCUSSION OF FINDING

Based on the finding of this research, the researcher has accepted the Null Hypothesis (H0): Ho1, Ho2, Ho4, Ho5, and rejected Ho3. Alternative Hypothesis for Ho3 is H3. Thus, the hypotheses of this research are H1, H2, H3, H4, H5 and H6 as shown below:

H1: Informative susceptibility has negative effect on attitude toward piracy

Based on the finding, informative susceptibility was not considered a factor that influenced consumer attitude toward optical discs piracy. In other word, it is not a significant predictor of attitude. This result is consistent with Ang *et al.,* (2001) and Wang *et al.,* (2005). That is, consumers are not dependent on expert advice or depend on others peoples' opinion before purchasing pirated optical discs. This is because the price of pirated optical discs are relatively lower than the original optical discs, thus, the cost of purchasing the wrong product is at minimum level. Due to this, the focus should be on the functional and also financial risk involved in purchasing pirated optical discs when devising any anti-piracy strategies.

H2: Normative susceptibility has negative effect on attitudes toward piracy

Normative susceptibility was not considered as a factor that influenced consumer attitude toward optical discs piracy. This shows that when making purchase decisions, customers are not concerned about other peoples' expectation or the impression that others have on them. This indicates anti-piracy strategies such as 'shaming' techniques might not work within this age-group or if the anti-piracy bodies still want to use this technique, a more effective education advertisement showing the shameful aspect of piracy should be developed.

H3: Value consciousness has negative effect on attitude towards piracy

Consumer's value consciousness is found not to be a major factor influencing consumer's attitude. This is consistent with past research that showed price is not the only determinant in consumer's decision on purchasing pirated products (Wee *et al.,* 1995). Consumers purchased pirated products for their functionality, rather than because they are cheaper. Buyers of pirated products make a purchase when they feel that these products possess important attributes similar to genuine products. When a

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pirated version can serve consumers at the same level as the original product, consumers are more likely to purchase pirated version. For example, students usually purchased pirated software to help them in completing their assignments and after they had completed their tasks, they might be not using the software anymore. Thus, manufacturer of original products should put an effort to differentiate their genuine version product with the pirated version so that consumer can value the genuine version more.

H4: Personal gratification has negative effect on attitude towards piracy

The findings shows that that consumers who put a high emphasis on a comfortable life, sense of accomplishment and value social recognition did not differ from those that are not, in terms of purchase in intention towards pirated goods. It shows that consumers who buy pirated version product do not buy the products for its quality but its functionality. That is, pirated products are not products for personal gratification and consumers do not view buying pirated product as affecting their sense of value or self-accomplishment.

H5: Novelty seeking has positive effect on attitude toward piracy

Novelty seeking is found to be an important factor that determines consumer's attitude to optical discs piracy that then will lead to their purchase intention. Generally, generation Y is a generation that always want to try new things in life, and they will find ways to fulfil their curiosity-needs about certain things (Cui *et al.,* 2003). Thus, Generation Y members will always look for alternative ways to get what they want. The motivation of exploring new things in life leads to their purchase decisions. For example, by buying pirated software, that is the way that consumers can try out new software/program. Most consumers want to know the best things about a product before making any purchase, thus the solution is to buy a pirated version before buying the real thing. Due to this, manufacturer should consider this situation where consumers actually want to experience the products before making any purchases. Manufacturers can consider producing a trial version which is originally from authorizing manufacturer.

H6: Consumers attitude toward piracy will influence and lead to their purchase intention.

This research identified that attitude towards pirated products was a significant predictor of purchase intention. Consumers who had more favourable attitude toward piracy were more likely to purchase pirated product themselves, buying for others as well as recommended them to friends and family. In this research, consumer's attitude toward pirated optical discs concerns consumer's evaluation toward original optical discs products. Consumers are more concern about product attribute's variables rather

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than concern about issues like the ethics or morality of buying pirated goods. This is inline with Nia and Zaichkowsky's (2000) observation that consumers who owned pirated products had a positive image of piracy and did not believe that pirated products were inferior.

Executive Summary and Managerial Implication

From this research and previous research (Wee *et al.,* 1995; Ang *et al.,* 2001; and Wang *et al.,* 2005), it shows that businesses and government bodies should play an increasing role in changing the attitude and beliefs of consumers toward piracy. A change in consumer's perception and mindset regarding intellectual property rights and pride in originality in works is vital as the first step towards fighting piracy. The finding of this research on attitude is important for anti-piracy organizations, policy makers and manufacturers to design anti piracy strategies:

Education Perspective: Large scale and continues campaigns are needed in educating the public about the implications of piracy. Economics and social consequences should be highlighted in educating the publics, starting from early adulthood such as in secondary schools. As shown in a study conducted by Ayupp and Perumal (2008) a shared vision and manpower training play a key role in developing a knowledgeable society. Through education, moral issues of piracy and information about the trading problems, employment and social welfare losses can be highlighted. This education will become effective if it can shows that in long term and indirectly, consumer's welfare also can be affected. When consumers realise that in the long term they also may become the victim, then they will be more reluctant to purchase pirated products. It is important here to instil moral and ethical values to the public so that they can realise buying pirated products is not an acceptable behaviour.

Legal Perspective and Enforcement: Strong enforcement of the law in protecting intellectual and property rights should be taken into account. Legal action should been charged to the producer or retailer of pirated products, but it should also strengthen the legal action against buyers. Piracy should be seen as a crime and it is hindrance of the development of successful music, films and software industries. Demand from consumers should be reduced because the supply of it simply mirrors demand. This is the root of the piracy issue problem. Ang *et al.,* (2001) discovered that consumers do not see purchasing pirated and products that stole other people's intellectual property as unlawful and unethical.

Strategy for Manufacturers: Original brand manufacturers should look at their

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marketing mix strategy in combating pirating of products. They should carefully segment their customers into several segments, and strategize the pricing to suit each subgroup. For example, software companies can segment their customers and produce suitable software or separate offers for each group. Trial version can be launch to fulfil consumer's curiosity need. Other than that, manufacturer also can apply modern technologies such as hidden magnetic or microchip tags, disappearing-reappearing inks, holographic images and digitised fingerprint labels (Mason, 1985). Most computer users now are accessing Internet service; with robust technology, manufacturers are able to identify computers that are using pirated software and that program can be terminated immediately.

7.0 CONCLUSION, LIMITATION AND FUTURE RESEARCH

Novelty seeking is found to be an important factor in influencing the public universities' students to buy pirated optical discs. Most of them were not bothered about the price they paid in purchasing a product. This is contrary to previous research that found that value consciousness had significant effect in determining consumer's attitude (Ang *et al.,* 2001). According to Cui *et al.,* (2003) at this age range (i.e. 19 to 24 years old), the curiosity level in individual is high. Buying pirated good are viewed as an alternative ways to fulfil their curiosity. That is why most of the respondent has positive effect of novelty seeking and attitude toward pirated optical discs. Social concern, product similarity, product functionality, product reliability, legal judgment and perception are measures of attitude that influencing consumer's purchase intention. Consumers who have a positive attitude of the six measures of attitude had a favourable attitude toward pirated optical discs and will lead to their purchase intention. They are more likely to buy pirated optical discs for themselves, buying for others and also recommended it to other people.

In term of the research's limitation, the survey was conducted in five major public universities and using students as the sample. Although the use of students as a sample is supported (Calder et al., 1981; Peterson, 2001), the generalizability to the whole population of consumers may be limited. Response of students might slightly be homogenous than those of non-students. It may influence how they evaluate each construct and relationship between construct (Wang *et al.,* 2005; Peterson, 2001). Furthermore, this study focuses only on optical disc piracy issue. Other categories of product and type of piracy may draw different responses from the subject, and thus this research finding may not be reliable in determining piracy issues of different products. For future research, replication with other products and populations are essential. Comparison between groups and demographic characteristics can also be done to provide more determinants of each factor that influences attitude toward

piracy.

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Impact of Assets and Profitability to Improve the Business Valuation: A Study

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ABSTRACT

As an outcome of liberalization, privatization and globalization, Indian capital market has witnessed considerable change in 1990s and 2000s. As a consequence, the relative importance of the variables determining the value of a business has also undergone some changes. In this backdrop, present paper made a modest effort to capture the impact of two most important variables namely total assets and operating profit on improving the value of a business. Here market capitalization has been considered as a measure of the value of the business. The paper concludes that the larger the volume of total assets and operating profit, the higher the value of the firm.

Key Words: Business Valuation, Market Capitalization, Total Assets, Profitability

I. Introduction:

As an outcome of liberalization, privatization and globalization, Indian capital market has witnessed considerable change in 1990s and 2000s. As a consequence, the relative importance of the variables determining the value of a business has also undergone some changes. In this backdrop, present paper made a modest effort to capture the impact of two most important variables namely total asset (TA) and operating profit (OP) on improving the value of a business. Here market capitalization (MC) has been considered as a measure of the value of the business. MC is an estimation of the value of a business that is obtained by multiplying a company's shares outstanding by the current market price of the share.

Why MC ?

MC is one of many ways to value a company. In the present study MC has been considered as it is the consensus openion of what the market thinks regarding the worth of the company (while book value is based on what accountants think the assets and liabilities of a company are worth). Besides this, MC is a short-cut that helps to determine how big or small a company is without doing all the calculations related to sales, revenues,

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liabilities, debt and all that. In a sense, MC is the true measure of a company's value. In fact, except for its use in some calculations, the per-share price is virtually meaningless to investors doing fundamental analysis. The reason we aren't concerned with per-share price is that it is always changing and since each company has a different number of outstanding shares, it doesn't give us a clue to the value of the company. For that number, we need the MC or market cap number. The market cap is found by multiplying the per-share price times the total number of outstanding shares. This number gives the total value of the company or stated another way, what it would cost to buy the whole company on the open market.

II. Objectives of the study:

- To measure the extent of relation between TA and MC of the companies under study.
- To evaluate the degree of correlation between OP and MC of the companies under study.
- To analyse the joint effect of TA and OP of the selected companies on their MC.

III. Methodology of the study:

The study is based on thirty three listed non-financial companies which have been selected considering "The BW Real 500" published by Business World, New Delhi, 27th October-2nd November, 2009 (Volume 29, Issue 24). The selected thirty three companies have been listed in Appendix 1. The rankings of the companies are based on the sum of total income and TA. TA and MC, as well as, OP and MC has been assessed through correlation coefficients between them taking into account their magnitudes (i.e. by Pearson's simple correlation coefficient).For studying the joint influence of TA and OP on MC, multiple correlation and multiple regression techniques have been applied. In order to examine whether the computed values of correlation coefficients and partial regression coefficients are statistically significant or not, t test has been used. The multiple correlation coefficients have been tested by F test.

IV. Findings of the study:

Table 1

Karl Pearson's Simple Correlation Analysis Between the Selected Variables (Total Asset & Operating Profit) and Ratio (Market Capitalization) Indicating Value of the Selected Companies in the Indian Industry

(Taking all the Selected Companies in a Consolidated Manner)

Company	Total Assets(Rs crore)	Operating Profit (Rs crore)	Market cap (Rs crore)
Indian Oil Corp.	145890.56	10495.67	46240.28
Reliance Industries	247168.35	25834.63	239964.89
Oil & Natural Gas Corp.	188594.38	42471.13	166874.83
Tata Steel	121682.79	18968.05	15042.9
Bharat Petroleum	54779.98	4782.41	13595.79
Hindustan Petroleum	49713.31	4121.95	9117.54
NTPC	116542.3	14166.4	148294.68
Tata Motors	74678.52	2322.64	8110.48
Hindalco Industries	68192.79	3581.63	8849.91
Reliance Communications	102219.09	11012.37	36089.51
Steel Authority of India	55864.01	11028.68	39837.71
Bharti Airtel	66654.76	14009.37	118782.36
Larsen & Toubro	56812.71	6039.93	39323.08
Bharat Heavy Electricals	48743.19	4438.77	73944.44
Sterlite Industries (India)	45111.93	6606.27	25335.76
Suzion Energy	37806.32	2641.8	6345.28
Essar Oil	23308.5	997.54	8717.1
Power Grid Corp.	54350.55	5793.31	40236.52
Mahindra & Mahindra	31989.63	4000.48	10696.98
DLF	49054.29	5873.88	28394.31
Gail (India)	29549.92	5283.99	31153.8
Wipro	28020.1	5446	36019.47
JSW Steel	34467.91	2207.09	4355.43
Tata Consultancy Services	22716.58	6735.22	52703.07
Tata Power	31969.2	4239.22	17018.68
Reliance Infrastructure	34712.94	2040.1	11626.88
Adani Enterprises	20133.82	1148.4	6600.49
ITC	20469.65	5512.69	69769.78
Grasim Industries	24387.13	4719.51	14504.29
Infosys Technologies	22163	7668	75836.97
Cairn India	39640.91	1299.4	34917.65
Aditya Birla Nuvo	27104.49	813.09	4227.44
Maruti Suzuki India	14061.6	2388.3	22530.65
Correlation Coefficient	0.742**	0.774**	

** Significant at 1% level.

Source: "The BW Real 500" published by Business World, New Delhi, 2009 (Volume 29, Issue 24).

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In Table 1 the effect of TA on MC and OP on MC in the Indian corporate sector has been examined. This has been done by computing Karl Pearson's simple correlation coefficient between TA and MC as well as between OP and MC taking all 33 companires as a whole. In order to test whether the computed values of correlation coefficient is statistically significant or not,'t' test has been conducted. Considering that more TA and OP increases the firm's MC, we expect a positive relationship between TA and MC as well as between OP and MC. Taking all the selected companies as a whole, Table 1 exhibits that there were positive association between TA and MC as well as between OP and MC, which were statistically significant at 1 per cent level.

In Table 2, multiple correlation analysis and multiple regression analysis have been used to investigate the joint influence of TA and OP on MC, taking all the selected companies in a consolidated manner. The ratios used in this analysis have been taken on their mean values of all the companies under study. The partial regression coefficients and the multiple correlation coefficients have been tested using the t test and F test respectively. The regression equation that has been fitted in this study is $MC= B_0+B_1.TA + B_2.OP$, where B_0 is the intercept, B_1 and B_2 are the partial regression coefficients. Table 2 shows that for one unit increase in TA the MC improved by 0.330 unit which was statistically insignificant. When OP increased by one unit, the MC stepped up by 3.244 units which was statistically significant at 5 per cent level.

Table 2 also reveals that the multiple correlation coefficient of MC on TA

Table 2

Multiple Correlation Analysis and Multiple Regression Analysis of the Selected Companies in the Indian Industry (Taking all the Selected Companies in a Consolidated Manner)

Multiple Correlation of MC on TA and OP	Regression Equation of MC on TA and OP: $MC= B_0+B_1.TA + B_2.OP$		
	Variable	Partial Regression Coefficients	t Value
$R = 0.794$ $R^2 = 0.631$ $F = 25.625$**	TA OP Constant	0.330 3.244 59.373	1.621 2.550* 0.007
** Significant at 1% level. Table value of F with (k,n-k-1), i.e. (2,30) degrees of freedom at 1% level is 5.39	*Significant at 5 per cent level. Table values of t with (n-k-1), i.e., 30 degrees of freedom at 5% level is 2.04.		

Source: "The BW Real 500" published by Business World, New Delhi, 2009 (Volume 29, Issue 24).

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and OP was 0.794 which was found to be statistically significant at 1 per cent level. This table also discloses that the selected influencing factors (TA and OP) contributed 63.10 per cent of the variation in the MC.

V. Concluding remarks:

- Computed values of Pearson's linear correlation coefficient of the consolidated position of all the selected companies under study give proof of the significant positive relationship between TA and MC as well as between OP and MC. Thus it conforms to that the larger the volume of TA and OP, the higher the value of the firm. In other words TA and OP have a positive correlation with the valuation of the firm.

- The partial regression coefficients shown in the multiple regression equation of MC on TA and OP fitted in this study reveals that OP made positive as well as significant contribution towards improvement of the corporate value.

- Although the joint influence of the TA and OP on the corporate valuation was very significant, it was possible mainly due to the efficient utilization of OP as reflected in the multiple regression analysis made in this study.

- It is clear from the outcome of the analysis of multiple determinations that 63.10 per cent of the total variation of corporate valuation was accounted by the joint variation in the volume of TA and OP.

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Appendix I	
List of the Companies under Study	
Sl. No.	Company
1	Indian Oil Corp
2	Reliance Industries
3	Oil & Natural Gas Corp.
4	Tata Steel
5	Bharat Petroleum
6	Hindustan Petroleum
7	NTPC
8	Tata Motors
9	Hindalco Industries
10	Reliance Communications
11	Steel Authority of India
12	Bharti Airtel
13	Larsen & Toubro
14	Bharat Heavy Electricals
15	Sterlite Industries (India)
16	Suzion Energy
17	Essar Oil
18	Power Grid Corp.
19	Mahindra & Mahindra
20	DLF
21	Gail (India)
22	Wipro
23	JSW Steel
24	Tata Consultancy Services
25	Tata Power
26	Reliance Infrastructure
27	Adani Enterprises
28	ITC
29	Grasim Industries
30	Infosys Technologies
31	Cairn India
32	Aditya Birla Nuvo
33	Maruti Suzuki India
Note: Serial number denotes the ranking based on the sum of total income and total assets.	

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Dynamics of Organizational Change and Employee Identity Retention in R&D Organizations

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Abstract

The purpose of this study is to understand the dynamics of employee identity retention and its impact on organizational change in a Research and Development organization. The role played by social embeddedness in enhancing employees' retention of self-identities and shaping their attitudes in resisting an orientation shift of organizational values and norms from that of civil services to distorting new public management orientation was assessed. The findings showed that the employees' resistance was influenced by their personal core values which were distrustful towards the organizations change process. Senior staff members were reluctant to forego their independence of working as individuals by adopting a teamwork culture. It is concluded that as a result of the employees holding tight to their self-identities and failing to relate to new organizational norms, the production that emerged from the commercialisation process was not in consonance to the organization's transformation needs.

Keywords: Organizational change; Self-identity; New public management; R&D organization

Introduction

In most developing countries, research and development (R&D) organizations were structured to function alongside other state-owned parastatals as fully government subsidized agencies. Based on this perspective, they operated as state-controlled non-profit making agencies, mostly offering free products and services to SMEs. Starting from the mid-1980s, however, the orientation of these R&D organizations as fully subsidized government agencies started to change. Along this line of change,

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most of them experienced technological transformations in a bid to provide them with the capacity to start generating supplementary income to cater for the reduction in the level of government subsidy they receive to support their operations. The rationale behind the changed images of the R&D organization is related to the fast-changing environment in most developing countries due to economic recession with capital taking a higher surplus of wealth. As it is noted in an Asian Development Bank (2001) report, the privatization of public sector enterprises in most developing countries has been a recurrent theme on the international development agenda since the early 1980s. Assistance for this purpose from international aid agencies has been cautious, placing priority first on supporting stabilization programs and improving existing operational efficiencies. Assistance has also taken the form of technical and financial support for institutional strengthening, enhancing autonomy, and price reforms. The consequence of this was that most governments in the developing countries were compelled by institutions such as the World Bank and other international donor agencies to pull back from their roles as the redistributors of income. An Asian Development Bank (2001) report noted that the International Finance Corporation (IFC), the Organization for Economic Cooperation and Development (OECD), and the World Bank have promoted privatization in structural policy reforms since the mid-1980s. Monitoring and evaluation of experience have provided a valuable global perspective while identifying changes in the operating environment necessary for privatization reforms. Mixed and often seemingly unpredictable results revealed early the need for a liberal macroeconomic framework, deregulation of banking, and reforms to enhance competition and enforce good governance. Appropriate policy reform for capital market development, together with better management of pension funds and other assets, has become part of the evolving process for effective privatization. This development led to key aspects of the economies of most developing countries being reformed to align with the free and competitive market economy paradigm. In this regard, as noted by Davis et al. (2000), the concept of enterprise was promoted in these developing economies and these were marked by the privatization and deregulation of government agencies. According to Davis et al, privatization is a key part of the so-called “Washington Consensus” they noted that both the IMF and the World Bank include privatization of some or all state-owned enterprises as an integral part of their structural reform packages. The World Bank is the leader in promoting privatization as an economic reform policy, but the IMF has cooperated closely with the World Bank in this regard. The majority of IMF programs in recent years have included some form of conditionality on privatization. The justification for this, according to Laban and Wolf (1993) is that privatization can lead to greater factor productivity in most cases and that the increased overall factor productivity will lead

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to better growth. The conventional wisdom in this respect is that the profit incentive will spur private organizations to improve production processes in a way the government, lacking those incentives, would be unable to do. The RTOs were affected in this respect, and the consequence of their privatization is the significant reduction in the subsidy they used to receive from their governments (Mengu and Grier, 1999). The consequences of these reductions in subsidies were the emergence of continued pressure from governments for the R&D organizations to become self-income generating. This situation resulted in most developing countries making several efforts to improve the technology capacity of their R&D organizations. This was based on the conviction that the R&D organization would possess the ability to provide effective services and products to potential clients, and hence be able to generate an equivalent income to compensate for the cuts in government's financial support to them. In this regard, there is the expectation that such public management reforms will lead to savings in public expenditure, improvement in the quality of public services, enhancement of the operations of government, and an increase in the chances that the policies which are chosen and implemented will be effective. Therefore by taking a cue from Clarke and Newman (1997) on the need to investigate this prescription in a country specific empirical research, and focusing on local circumstances (Deem, 2001), this paper investigated, a recent commercialization drive among public sector institutions in an African country. The purpose is to understand the impact of organizational and management changes that took place in the country's R&D Organizations and the implications of shifting organizational values, and norms within the mist of strengthened, but segregated professional identities among employees. A particular focus here is to understand the role played by social embeddedness (Granovetter, 1992) in possibly shaping, resisting or distorting the intention of the R&D organization's new public management orientation.

Literature Review

The concept of new public management (NPM) was developed across many OECD (Organization for Economic Co-operation and Development) countries in the late 1970's and early 1980's in response to the growing concerns about bureaucratic inertia and self-serving professionals within public organizations in combination with the costs of managing the public sector by tax-paying middle class voters. In this perspective, Hood (1995) identified two associated shifts. These are the removal of differences between public and private sectors, and also a move towards greater accountability. Hood (1995) delineated the various manifestation of NPM as follows; greater disaggregation of public sector, organizations into separately managed units, enhanced competition using private sector managerial techniques, emphasizing on

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‘discipline and parsimony’ in resource use, the use of greater ‘hands-on management’, adoption of measurable standards of performance, and the use of ‘pre-set output measures’. As Metcalfe and Richards (1987) have noted, the field of public management is better defined analytically than institutionally. They noted that public management is concerned with the effective functioning of whole systems of organizations and what distinguishes it from other forms of management is its explicit acknowledgement of the responsibility for dealing with structural problems at the levels of the system as a whole. Therefore, in the opinion of Pierre (1995), public administration can be conceived as the key output linkage of the state towards civil society. However, He noted that the interface between public administration and civil society is a two-way street, including public policy implementations as well as policy demands private actors towards policy-makers.

In the view of Clarke and Newman (1997), people talk about the managerial state because they want to locate managerialism as a cultural formation and a distinctive set of ideologies and practices which form one of the underpinnings of the emergent political settlement. Based on these perspectives, the practice of public administration may be interpreted as a social system existing and functioning in accordance with its own order, but on the other hand, it also depends on environmental conditions in a complex and changing society (Pollitt and Bouckaert, 2000). The introduction of changes that can lead to an improvement in corporate performance and increase in productivity are paramount issues for all leaders and their success in one way or the other depend more and more on the people they lead. At the same time, individuals being led in the face of multiple responsibilities, commitments and demands face the tremendous challenge of making a meaningful and significant contribution to their organization without neglecting other important areas of their lives. Consequently, employees have realized that their overall quality of life is largely determined by their work. As such, most appear to be dissatisfied with their careers and lives. Based on this presumption, public sector organizations in both developed and developing countries have been the subjects of transformation carried out within the perspectives of new public management reforms. As Pollitt and Bouckaert (2000) noted,, public management reforms consists of deliberate changes to the structures and processes of public sector organizations with the objective of getting them to run better. According to Jarzabkowski (2003), if practice is taken as the repetitive performance that leads to the attainment of recurrent, habitual or routinised accomplishment of particular actions, then it could be argued that practice brings recursiveness and adaptation into a dialectic tension in which the two are inextricably linked. Based on this perspective, practice could be said to occur in both macro and micro contexts. In the macro context,

practice occurs through the provision of commonalities of action, while in the micro context, it occurs through actions that are highly localized. The interaction between these two contexts, as Jarzabkowski (2003) argued, provide an opportunity for adaptive practice in which recursiveness is always improvised. Such adaptive practice also has a durability about it that can constrain attempts to transform activity sequences entailed in it. This durability is considered by Jarzabkowski (2003) as constituents of sedimented rules and resources that govern how to act, and could thus be viewed as a code-of-practice or even best practice. According to Jarzabkowski (2003), practice is an evolving process of social order arising from the interplay between external and internal social structure building. As Jarzabkowski (2003) explained, change is carried out within the internal social structure in interaction with the external social structure with its current of social movement which signifies the wider societal context. Therefore, in every practice there is always a process of social becoming that needs to be realized, and understanding of practice would require the penetration of the situated and localized nature of practice in both contexts (Jarzabkowski, 2003). This is because, in the discourse on community of practice (e.g., Lave and Wenger, 1991; Cook and Brown, 1999), individual thought is viewed to be essentially social. By implication, individuals are seen as developing their thoughts by interacting with the practical activities of their communities, through living and participating in its experiences over time. Practice must be seen as local and situated, arising from the moment-by-moment interactions between actors, on one hand, and between actors and the environments of their action, on the other (Suchman, 1987). Jarzabkowski (2003) noted that rather than looking for structural invariants, normative rules of conduct, or preconceived cognitive schema, therefore, practice scholars should investigate the processes whereby particular, uniquely constituted circumstances are systematically interpreted so as to render meaning shared. According to Cooper et al. (1996), organizational change represents not so much a shift from one archetype to another, but a layering of one archetype on another. Dent et al. (2007) explained that what is exposed at the surface of the organization is the result of a complex and historical process of faults and disruption, and also erosions as well as strengths of the archetype.

Materials and Methods

The study was carried out in an Africa public organization. Before gaining access to the study participants, initial contact was firstly established with the Head of the organization to know if the management was prepared to support the study by allowing unhindered access to employees from whom data could be sourced. The management, in turn, also sought a good understanding of the research purpose and

the expected learning that their organizations could derive from the findings. A short research synopsis was sent to each organization to aide their understanding of the research purpose. Based on this, a commitment of support and cooperation was received from the organization allowing unhindered access to data collection

*S*tudy participants

Purposive sampling characterized by a sense of snowballing (Patton, 1990) was used to select the study participants (i.e. data sources). This was based on the researchers criteria that persons each person viewed as source of data must "have-lived" the privatization process and thus have knowledgeable insights of the changes in the work environment. In this respect, twenty employees (i.e. interviewees) were selected. These employees were identified to have played variety of key roles in their organizations' privatization process. As such, their individual implicit beliefs on actions during the process were sourced in the interviews.

*D*ata collection

The mode of understanding implied by qualitative research involves alternative conceptions of social knowledge, meaning, reality, and truth in social science research. As such, there is a move away from obtaining knowledge primarily through external observation and experimental manipulation of human subjects toward an understanding by means of conversations with the human beings to be understood (Kvale, 1996). By implication, the basic subject matter is no longer objective data to be quantified, but meaningful relations to be interpreted (Kvale, 1996). Therefore, data was collected in this study using the interview approach. This was because in the dialogue (i.e. interview conversation), the subjects (interviewees) do not only answer the questions prepared by the researcher (interviewer). They (interviewees) also had the space to formulate their own conceptions of their lived world (Kvale, 1996; Sanda, 2010). The expectation here was that the sensitivity of the interview approach and its closeness to the interviewees' "lived world" would lead to the evolution of knowledge that could be used to understand the relative outcome of the organization's transformation processes (Sanda, 2006). Thus the interview process created a platform based on which the interviewees answered not only the lead questions prepared for them, but also had the opportunity to formulate their own conceptions of issues in the organizations in which they worked during the interview conversation. The interviews were tape-recorded and the average time for each interview session was one hour. Duration for data collection was 2 weeks.

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*D*ata analysis

The interviews were viewed as conversations about the interviewees' life-world, with the oral discourse transformed into texts to be interpreted hermeneutically (Kvale, 1996). Since the purpose of hermeneutical interpretation is to obtain a valid and common understanding of the meaning of a text, then hermeneutics is of double relevance to interview research. As Kvale (1996) explains, hermeneutics, firstly, elucidate the dialogue that produces the interview texts to be interpreted. Secondly, it clarifies the subsequent process of interpreting the interview texts that are produced, and which may again be conceived as a dialogue or a conversation with the text. In this respect therefore, the recorded interviews were transcribed and scripted (Kvale, 1996). The validity of the scripts generated for all the interviewees was established by crossing-checking with each interviewee. An interpretive description qualitative approach (Thorne et al. 1997; Brazier et al. 2008; Sanda, 2011) was then used to analyze the scripts generated from the interviews. Using this approach, the experiences of the interviewees during the transformation of activities in their respective organizations are described and interpreted, but without reconfiguring them into a more highly interpretive form, such as the theoretical framework that is created in a grounded theory approach. Instead, the findings were made to stay closer to the words of the interviewees. It described their experiences and at the same time captured the meaning they attributed to these experiences (Brazier et al., 2008; Sanda 2010).

Results

The results are analyzed from the perspectives of the following two themes; (i) path towards Commercialisation, (ii) Institutional restructuring, and (iii) Game-play between new norms and identity retention

*P*ath towards commercialisation

The organization's commercialisation process emanated from a decision by the country's Government to cut down on its yearly subvention to all government R&D agencies. This decision was a result of the economic recession in most developing countries which necessitated the privatisation of most government agencies. The government's expectation was that the organization must acquire the requisite competence to generate income on its own. In order for the organization to be able to align itself towards its new orientation, it undertook to transform its organizational activity system by implementing the RTO best management practices (as a modelled new solution). Thus, the commercialization of the organization, which is the umbrella

body of fourteen research institutes, was initiated under the government's Private Sector Development Project (PSDP). This was a World Bank-financed project which aimed at restructuring and commercializing the operations of the organization's secretariat to enable it provide technical support to industry and answer to the needs of the private sector. The objective was to enable the organization help raise the technological and productive capabilities of local industries and enhance their competitiveness. The organization's commercialization was also facilitated by the Capacity Development and Utilization Project (CDUP) which was supported by the United Nations Development Program. This was to enable the organization commercialize science and technology information through the forging of linkages with the micro, small and medium scale enterprises at the downstream levels of the construction, non-traditional exports and tourism sectors.

Institutional restructuring

Two government project initiatives constituted the platform for the introduction of the public management reform concept in the organization. This reform consisted of deliberate changes to the structures and processes of the organization with the objective of getting it to run better. In this regard, new structures and programs were put in place to ensure commercialization of research. Firstly, a Central Business Development Unit (CBDU) was established and headed by a commercial manager. The function of this unit was to coordinate the commercialization activities of all the Institutes under the organization as well as to serve as a focal point and referred center for clients. Secondly, Business Development Units (BDUs) were established at all the institutes under the organization. The role of the BDUs was to undertake periodic client needs assessment surveys and liaise with the CBDU in such matters as partnership agreements and commercialization projects. Thirdly, a Central Commercialization Monitoring Committee chaired by the organization's head was set up to coordinate the work of all the individual Institutes under the organization. It was revealed in the interviews that these institutional restructuring generated tension between the staff and the management.

> *To be quite honest, the organization is not a rules-driven organization anymore. You occasionally have some people who argue that there are so many rules and constraints in the organization. I think the rules that are guiding our operations now are the old rules which have been adopted into the new system. They have never been changed. In fact, they are not consistent with the way we are supposed to function now. If we still continue to have confusion about the structure of the*

> *organization, then how can we really get a clear picture of the division of labour? I think the current management structure is not right.*

The emergence of such a development created a platform for "fault-finding" exchanges between government technocrats and the affected staff members of the organization. This gave rise to a scenario whereby the government continued to point its fingers at the organization's staff for lack of success in the commercialization effort. In the same vein, the organization's staff also pointed their finger at the government for lack of success.

Game play between new norms and identity retention

Despite the attempt to introduce the best practices for business development in the organization, the rules that prevailed were shaped by civil service codes which lacked the requisite flexibility to relate to the requirements of the commercialization efforts. The consequence of this development was that the character of governance in the organization continued to be strongly influenced by the bureaucratic management approach underlined by an organizational structure that remained vertical and hierarchical (based on job description). This observation was opposite to the requirement of the best practices for organizational management which opted for a project-oriented management style (based on objectives). This showed that despite the provision of specific guidelines in the best management practices to enhance the organization's commercialization effort, its organizational structure and governing rules basically remained vertically hierarchical and highly bureaucratic. The retention of the old management structure also made it difficult for the organization to implement the best practice for personnel management which required inputs from managers and the workers alike. The consequence of this, as highlighted in the interviews, was the creation of distinct class groups within the staff membership, and which situation compounded the management's difficulty.

> *When it comes to the issue of collaboration, I get disappointed. I still think that we have a long way to go in this direction. Whenever you are, say, part of a team in a project, it is very difficult to send your message across to the rest of the team members. Now let us say the project manager from another unit manages that team, but for the unit manager here, those people are still his. So, somewhere along the line, there is going to be conflict, because one will expect them to do something here, but they will end up busily doing something there.*

> *There is also this thing you see in the team members, thinking that the project is for this unit and not for that unit. So the system does not encourage networking.*

The organization' employees were classified into three main groups whose distinct identities were shaped by the hierarchical management structure. These distinct groups were the management team, senior staff (i.e. researchers/scientist) and junior staff (i.e. technical and administrative support personnel). The result of such distinction was the creation of tension among the three different groups due to their constrained existence. This tension was underscored by the senior staff members most of whom perceived their junior counterparts to be undisciplined and not well-trained on the fundamentals of work ethics. Even among those who expressed such view, there were others who also held the opinion that some of their own colleagues tolerated such acts of indiscipline, and even encouraged them to some extent, by refusing to sanction junior staff members viewed as offenders. In the same vein, some of the middle-level staff members also perceived themselves as being subjected to bias when it came to the issue of job status. The realization here was that the expected input for the best practice in personnel management, especially from the junior staff members during the commercialization was absent. Additionally, the prevalence of this tension led to the generation of mistrust as well as the fear of intimidation among the junior staff members within the organization. This mistrust was so deep-rooted between the different groups to the extent that it rendered the rules underlined by the best practice for business development inapplicable. The relevant structures for this practice were created, but the attempts by the organization's management to make them institutional were stalled. As exemplified in the interviews, this has to do with the senior staff members resisting the new business rule that required a corporate business development group to handle the organization's awareness and market strategic planning. The senior staff members argued that, by the nature of the outlined structure for the business development strategy, their control over the direction of research activity in the organization would be diminished. Therefore, the consequent disturbances that emerged as a result of the integration of a significant aspect of the organization's old rules and the business element of the best management practices did impact negatively on the ability of the organization's to commercialize.

> *There is no trust in the working environment. There is also no commitment to the organization's objectives by the staff. All these have arisen because there is nothing like a new organizational culture with*

> *which the staff could have themselves identified. We are not integrated. We do not have inter-functional teams. Each team is defending its own unit within its own department. Every department head is defending his department. We are not working as one. I saw a copy of the recent strategic plan and I brushed through it, because I am not part of the management that wrote it. I foresee a problem for it to succeed, because the organization still has the same mind-set, the same culture, and the same leaders. I was thinking that maybe, such a strategic plan should have come out after the organization has revived itself. Now we are having these solutions, and for what problems, nobody can understand.*

The incompatibility between the activity systems of the senior staff members and their junior colleagues was a result of the historically accumulating structural tensions that had accumulated both within and between their respective activity systems. The activities of the senior staff members were guided by the old object of the organization's activity system (i.e. carry out scientific research to improve the country's technological base). This contrasted with the activities of the junior staff members whose actions were guided by the object of the new object of the organization's activity system, (i.e., commercialize and generate income). The activity system for the senior staff members showed the existence of a cumulated tension between them as a group of scientists and the new rules that emphasized teamwork in the organization's commercialization process. The indication here was that the senior staff members showed great reluctance to accept change, especially by foregoing their previous independence and partnering others in the community, including their junior colleagues. They rather continued to show their preference for working as individuals as compared to teamwork. This therefore, indicated the existence of structural tension between them, as a group, and the corresponding division of labor that was to have prevailed during the commercialization process. In the same vein, similar tension prevailed between them and other groups in the community. There was a general consensus among the interviewees that the quality of communication within the organization was poor. The breakdown in the information flow process and feedback mechanism within the organization portrayed the inefficiency and ineffectiveness of the communication system. The management failed to enhance regular interaction with the staff members during the commercialization process. This contributed to the segmentation of the workforce, leading to the creation of the tensions between the different groups and consequently creating the disturbances between the different elements of the management's activity

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system.

Discussion

The results generally highlighted a perceptive shift by organization's staff members towards the commercialization process. This perceptive shift was influenced by the conflict that arose between the staff member's self-core values and the organization's professed values for the commercialization process. This culminated in the development of mistrust from the organization's key stakeholders, especially the government as external stakeholder, and organizational employees as the internal stakeholders. The rationale for such mistrust could be related to the observation that activities in organizations are realized as individuals and cooperative actions, as well as chains and networks of such actions, both of which are related to each other by the same overall objective and motive (Kuutti, 1995; Sanda, 2011). Such mistrust was made visible due to the abilities of the actors to distinguish one activity from another according to their motive (Sanda, 2011). As it was highlighted in the results, the emergence of the conflicts and their accompanying disturbances were a result of the integration of a significant aspect of the organization's old institutional rules with the new ones entailed in the best management practices. The disturbances appeared in the form of both structural and human tensions and were able to impact negatively on the ability of the organization to commercialize. This is because the goal of an action is a conscious mental representation of the outcome to be achieved with its function being the orientation of the action (Leontiev, 1974). Thus the actions are of actors in the organization constituted fundamental components of their activities which were subordinated to self induced goals other than organizational-set goals (Sanda, 2011). The retention of the organization's old institutional rules underscores the theoretical position that such actions are normally done, because it leads to the strengthening of government's control over the bureaucracy entailed in the administration of the affected organizations (Pollitt and Bouckaert, 2000). Such retention also leads to the freeing of public officials from those bureaucratic constraints which normally inhibit their capacity to manage government policies and programs, as well as enhancing its accountability to the legislature and the citizenry. The disturbances and tensions in the activity system of the senior staff of the organization could be attributed to their reluctance in relating to the best practices for project management and business development, both of which defined the characteristics of the division of labor. This created the atmosphere that resulted in further tension between them and other groups in the organization. Thus in contrast to the synergy expected to emanate within the organization's community, what emerged

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was structural tensions within the organization which gave rise to the senses of distrust among different groups. This observation could be attributed to the continued influence that the organization's past history, which was shaped by the civil service culture, had on the staff members' attitude. It also reflected the inability of the organization's management to infuse the new and acceptable organizational culture (values and norms) shaped by the best management practices being implemented, and which was an important requirement of the commercialization program. As Jarzabkowski (2003) explained, practice occurs not only in macro contexts that provide commonalities of action, but also in micro contexts in which action is highly localized, and the interaction between these contexts provides an opportunity for adaptive practice. Jarzabkowski views "practice" to be an evolving process of social order arising from the interplay between external and internal social structure building. In this context, external structure is the wider societal context, in which there is a current of social movement, and change is carried out within the internal context in interaction with the external context. Thus a process of social becoming could be said to have emerged in the organization through as a result of the various occurrences, among the different actors. Evidence of this was the senior staff members holding on to their old self-identities (Giddens, 1991) as individuals with the power and authority to dictate the direction of research in the organization. As individuals, the senior staff members portrayed the three aspects of the self as underlined by Harre (1998). In this regard, they could be perceived as each portraying individual sense of self as a singularity in the way they projected the totality of their personal attributes based on the way they feel to seem as individuals in the organization as compared to the other category of staff. The scenario showed that social identification among the organization's staff is categorical (Taylor, 1998) rather than collective (Jenkins, 2008). It also underscores Clarke and Newman (1997) argument that people talk about the managerial state because they want to locate managerialism as a cultural formation and a distinctive set of ideologies and practices which form one of the underpinnings of the emergent political settlement. Based on this perspective, administering the organization as a privatizing public institution requires that it is perceived as a social system that has to exist and function in accordance with its own order. This because in a 'community of practice' individual thought is essentially social and is developed in interaction with the practical activities of a community, through living and participating in its experiences over time (Lave & Wenger, 1991; Cook & Brown, 1999). Thus, in order to understand practice, it is important to move beyond institutional similarities to penetrate the situated and localized nature of practice in particular contexts (Jarzabkowski, 2003). Practice is seen as local and situated, arising from the moment-by-moment interactions between actors, on one hand, and between

actors and the environments of their action, on the other (Suchman, 1987). Jarzabkowski pointed out that rather than looking for structural invariants, normative rules of conduct, or preconceived cognitive schema, therefore, practice scholars should investigate "the processes whereby particular, uniquely constituted circumstances are systematically interpreted so as to render meaning shared". This view reinforces an earlier view of Cooper et al. (1996) who argued dialectically that organizational change represents not so much a shift from one archetype to another, but a layering of one archetype on another. Thus what is exposed at the surface of the organization is the result of a complex and historical process of faults and disruption, and also erosions as well as strengths of the archetype (Dent et al., 2007). As Dent et al. (2007) noted, there are parallels here with 'path dependency' (Wilsford, 1994) although that approach has the advantage of being much more self–consciously historical in assuming that later events (such as adapting to NPM) will be shaped by the earlier ones. An issue of interest that emerges from Dent's et al. (2007) view relates to the success-prediction of such later organizational event as the adaption of NPM. In agreement with Ravenaugh (1994), implementation is the challenge that comes at the end of all new (and old) methods/practices for improving organizations. But also arguing along the lines of Pollitt and Bouckaert (2000), such an existence might also need to depend on the organization's environmental conditions in as influenced by the complexity and the changing character of the society in which it exist.

Conclusion

The study has shown that the perception of the staff members towards the commercialisation process was influenced by their personal core values as against those of the organizations. The institutional structures that prevailed lacked the flexibility to enhance change in the organization. This culminated into employee groups' becoming distrustful and suspicion of the organizations change process. The senior staff members showed great reluctance to accept change, especially by foregoing their previous independence and partnering others in the community, including their junior colleagues. They continued to show their preference for working as individuals as compared to teamwork. The organization also allowed its civil service culture to influence the staff members' attitude. This made it impossible for the organization to introduce new and acceptable organizational culture (values and norms) which was an important requirement of its commercialisation. These developments made governance in the organization a difficult task. It is therefore concluded that as a result of the employees holding tight to their self-identities and

failing to relate to new organizational norms, the production that emerged from the commercialisation process was not in consonance to the organization's transformation needs. This was a result of the failure of the organization's management to ensure the complete overhaul of the previous system prior to starting the commercialisation programme.

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A RECAPITULATION OF SCM IN CONJUNCTION WITH TEXTILE INDUSTRY

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Abstract

This study is an endeavor to explore the supply chain management specifically in connection with textile/apparel industry of a developing country. A review of pertinent literature is conducted to explore the continuation of supply chain management and its existence in textile/apparel industry of a developing country. Databases such as: EBSCO Host, Emerald, ABI/INFORM Global, and Science Direct are searched for the works concerned to supply chain management. The review of literature suggests that there is lack of consensus about the definition of supply chain management, and textile/apparel industry of a developing country, is being neglected in the perspective of supply chain management. This study enriches the knowledge of supply chain management by describing the categories of supply chain management, discussing a lack of consensus about the definition, and describing a comprehensive definition for supply chain management. Moreover, it contributes to supply chain management by identifying the gaps, so that future research for supply chain management, in textile/apparel industry of a developing country, should be conducted.

Keywords: supply chain management, textile industry, categories of SCM

1. Overview of Supply Chain Management

Supply chain management (SCM) is growing to be well-liked and its popularity is rendered by an escalating number of practitioner and academic publications, conference, professional development programs and university courses in the area

(Burgess, Singh, & Koroglu, 2006). Academic debate today acknowledges the SCM's importance and its recognition as an important field of management; it has been developed globally with both practitioners and academics (Cousins, Lawson, & Squire, 2006).

To date there has been little agreement on the definition of supply chain management. A review of literature pertaining to SCM implies that researchers have proposed several definitions of SCM and there are approximately one hundred and seventy-three definitions of SCM (Stock & Boyer, 2009). However, there is a lack of consensus among researchers and practitioners for the conceptualization of SCM. Supply chain management is relatively a new field and a consensus is needed for its definition. Lack of consensus for conceptualization of SCM creates a number of gaps for the researchers in the field of SCM (Burgess, et al., 2006). Researchers and practitioners cannot be proficient to advance the theory and practice of SCM without adopting an identical and mutually agreed upon definition of SCM. Researchers and practitioners in the field of SCM can be benefitted to a great extent with a sole integrated definition of SCM (Stock & Boyer, 2009), and they have searched out to indentify three broad premises of SCM and a contiguous explanation of SCM.

Academic and practitioner world still have confusions about the definition of SCM (New, 1997) and there are diverse conceptualization about the definition of SCM (Burgess, et al., 2006; Halldo´rsson, Larson, & Poist, 2008; J. Mentzer et al., 2001). However, the varying conceptualization of SCM have important implications for its implementation (Halldo´rsson, et al., 2008). Mentzer (2001, p. 7) has defined the SCM as, "Supply chains are a set of three or more entities (organizations or individuals) directly involved in upstream and downstream flows of products, services, finances and/or information from a source to a customer." Additionally, Seuring (2008) has quoted a definition of SCM, "Supply chain management is the integration of these activities through improved supply chain relationships to achieve a sustainable competitive advantage." Cooper and Ellram (1993, p. 13) have defined SCM as, "an integrating philosophy to manage the total flow of a distribution channel from supplier to ultimate customer." Another definition is stated by Romano and Vinelli (2001) as, "…used to refer to the integrated management of a network of entities, that starts with the suppliers' suppliers and ends with the customers' customers, for the production and delivery of goods and services to the final consumers."

Recently, supply chain management is defined very comprehensively by Stock and Boyer (2009, p. 706), "The Management of a network of relationships within a firm and between interdependent organizations and business units consisting of material suppliers, purchasing, production facilities, logistics, marketing, and related

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systems that facilitate the forward and reverse flow of materials, services, finances and information from the original producer to final customer with the benefits of adding value, maximizing profitability through efficiencies, and achieving customer satisfaction".

2. Supply Chain Management in Various Industries

SCM literature constructs it noticeably that research for SCM is being carried out in various industries such as automobile, construction, food, computer, health care, retail and textile. However, automobile industry is dominating with the number of studies for SCM. Recently, a study has described a (3Cs) of modular supply networks in the Chinese automotive industry for further expansion of the theory of SCM (Lin, Zhou, Shi, & Ma, 2009). Computer industry is having a decision-making model for manufacturers to maximize their profits in reverse logistics operations (Tan & Kumar, 2006). Information technology industry is studies to explore SCM as Sahay and Mohan (2003) reported, "… the status of supply chain management (SCM) in India along four dimensions of supply chain – namely supply chain strategy, supply chain integration, inventory management and IT in the Indian set-up."

SCM is also prevalent in construction industry, as a very comprehensive approach to construction project for SCM was introduced (Love, Irani, & Edwards, 2004) and it has projected and claimed a flawless SCM model, that puts together the design and production processes of construction projects. Moreover, some SCM issues in construction industry in the context of TQM, are also identified (A. Wong & Fung, 1999). Health care industry has been studied in the context of SCM (Allen, Wade, & Dickinson, 2009; Bakar, Hakim, Chong, & Lin, 2010). SCM research has been done in paper industry and it has reported that supply chain distribution process of North European paper industry is facing rigorous improvement challenges (Koskinen & Hilmola, 2008).

Pharmaceutical industry is investigated for SCM to describe 'an understanding of the decisional process that leads a company, at a given point in time, to choose the subsequent supply chain management (SCM) initiative to be implemented'(Danese, Romano, & Vinelli, 2006). Internal SCM in the Chilean sawmill industry was investigated and it has originated a prospect to enhance profits of the industry further fifteen percent (Singer & Donoso, 2007).

Toy industry was explored to investigate SCM practices and revelation of practical and theoretical gaps in toy supply chains (C. Y. Wong, Arlbjorn, & Johansen, 2005). There are several studies on SCM in several industrial sectors such as automobile, apparel, chemical, computer, telecommunication, agriculture/food and grocery (C. Y. Wong, et al., 2005). Undoubtedly, SCM is well recognized concept in manufacturing; however, service industry is also acknowledging it now. Value of

successful implementation of SCM in service industry is recognized by practitioners and academics, and the effect of implementation of SCM is as well beneficial for service industry (Cook, DeBree, & Feroleto, 2001).

3. Supply Chain Management in Textile/apparel Industry

Certainly considerable amounts of literature have been published for SCM in various industries and possibly few attempts have been made to investigate SCM in textile/apparel industry. Time consuming and labor intensive processes are the characteristics of textile/apparel and perhaps due which implementation of modern SCM is obstructed in the industry (Fernie & Azuma, 2004); therefore, SCM research is neglected in textile/apparel industry (Bruce, Daly, & Towers, 2004). The subsequent discussion focuses on distinctive purposes of research for SCM in textile/apparel industry and a number of researchers have put emphasis on contrasting purposes such as, a study explored the issues of implementation of the coordination of SCM specifically in textile/apparel (Cao, Zhang, To, & Ng, 2008).

Characteristics of textile/apparel industry are investigated in the context of lean and agile SCM (Bruce, et al., 2004; Masson, Iosif, MacKerron, & Fernie, 2007); and supply chain collaboration and its benefits are explored (Cetindamar, Çatay, & Basmaci, 2005). SCM in the context of quality, logistics, forecasting techniques lead time, inventory management is illustrated for small to medium sized companies (Teng & Jaramillo, 2006); however, an evaluation model is developed for textile/apparel manufacturers to maintain their competitiveness in the global textile/apparel business (Teng & Jaramillo, 2005). Moreover, textile/apparel industry is investigated to enhance the understanding of collective competitive advantage through SCM (Ho, 2005); while, how to create competitive advantage through SCM practices is researched recently in textile/apparel industry (Nuruzzaman, Haque, & Azad, 2010).

Further review of concept of SCM in textile/apparel revealed that forecasting errors for fashion items, long production lead time, and short product cycle for fashion articles are some distinctive problems faced by the industry (Lam & Postle, 2006). Operative and strategic consequences due to quality management with the utilization of SCM in textile/apparel industry are inquired for a single organization and the entire supply network (Romano & Vinelli, 2001). Recently radio frequency identification (RFID) system is introduced to assist the coordination and integration of supply chain functions and activities in textile/apparel (Kwok & Wu, 2009). The issues in quality and communication management for clothing supply chain models between UK and China are as well identified to offer some insights into SCM (Chen, Murray, & Jones, 2007). Additionally, industry cluster theory within the context of supply chain management decisions for textile industry is introduced (Bozarth, Blackhurst, & Handfield, 2007).

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A large and growing body of literature has investigated vendor selection in industrial marketing research; however, a study has determined the vendor selection criteria for overseas vendors in textile/apparel industry (Thaver & Wilcock, 2006). Another relatively new dimension of SCM research is environmental supply chain management, environmental SCM in Danish textile industry has analyzed to indentify various practices of environmental SCM (Forman & Jørgensen, 2004); while, a study has investigated Swedish supply chains for textiles made from organically grown cotton in the contexts of environmental supply chain management (Kogg, 2003). UK clothing industry is also examined to imply SCM for innovative developments within the industry (Bruce & Moger, 1999).

The above discussion reveals that researchers have studied SCM in textile/apparel industry with varying purposes and out of theses varying purpose somehow one common objectives is to create competitive advantage through the utilization of SCM. A supplier selection criterion is possibly the most researched topic in SCM and it is also explored in textile/apparel industry. Moreover, textile/apparel industry has been investigated with a new emerging concept of environmental supply chain management (Forman & Jørgensen, 2004; Kogg, 2003).

However, comparatively to another industry such as automobile, still there is a need to further the research of SCM in textile/apparel industry, specifically for the industry of the developing countries, because previously mostly studies are conducted in the industries of developed countries. The further exploration of supply chain management in textile/apparel industry of a developing country may possibly assist to improve SCM theory and its application specifically for the industry a developing country. Possibly no specific framework for textile/apparel industry of a developing country is present in the pertinent literature. Therefore, it is suggested that further exploration of supply chain management in the textile/apparel industry of a developing country can assist the practitioners and academicians of supply chain management.

4. Categories of Supply Chain Management

The past decade has seen the rapid development and diffusion of supply chain management in many industrial sectors. A consider amount of literature has been published about supply chain management; therefore, it is possible to categorize the supply chain management. Thirteen categories of SCM are indentified in an investigation for a decade of SCM published literature in renowned academic journals (Giunipero, Hooker, Joseph-Mathews, Yoon, & Brudvig, 2008). The last decade has acknowledged enhanced attention for the role of strategy in supply chains and it is supposed to be aligned with the firm's overall strategic direction (Sebastiao & Golicic, 2008). A review of literature about the first category of SCM i.e., SCM strategy;

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reveals that mostly theories and conceptual frameworks for SCM research are illustrated from strategy literature, for example resource based view of the firm is taken from strategy literature (Hsu, Tan, Kannan, & Keong Leong, 2009; Hult, Ketchen, & Arrfelt, 2007). Therefore, an improved understanding of supply chain strategies is required in field of SCM (Sebastiao & Golicic, 2008). A considerable amount of literature has been published for supply chain strategy and mostly researchers have pointed out the need for the integration of supply chain strategy with the firm's overall strategy (Giunipero, et al., 2008).

However, some studies have attempted to explain the importance of alignment between supply chain strategy and business strategy (Mitra & Bhardwaj, 2010; Narasimhan, Kim, & Tan, 2008). Strategic alignment between corporate and supply chain is imperative to survival and to remain competitive for the firms in this globalized environment. Undoubtedly this category of SCM has received immense attention for the past twenty years and now it is possibly at the maturity stage in the context of its understanding. The supply chain literature makes available three types of supply chain strategies: lean strategy, agile strategy, and lean/agile strategy (Qi, Boyer, & Zhao, 2009). Lean strategy focuses on cost reductions, agile strategy tries to integrate networks and lean/agile strategy can quickly respond to an unpredictable demand (Morgan, 2007).

The second category of SCM is 'SCM frameworks, trends and challenges.' There is much discussion in literature that competition is shifted between networks despite the competition between companies; and this focus has increased complexity to the management of supply chains (Gripsrud, Jahre, & Persson, 2006). Therefore, the firms not only have to manage their own organizations but also have to manage the entire network of supply chain. However, sharing of resources and capabilities, enable channel members to offer better service at a lower cost. What we know about SCM frameworks is largely based upon the research for future trends, supply chain definitions, historical reviews, and problems/benefits of SCM (Giunipero, et al., 2008).

The third category of SCM is alliances/relationships. In recent years the strategists are trying to seek opportunities to improve the firm's position in an existing network or creating a new network and it incorporates the concepts of partnerships and strategic alliances (Mills, Schmitz, & Frizelle, 2004) so a great deal of attention has been drawn in literature for relationships of channel members in SCM (Jean, Sinkovics, & Kim, 2010). Alliance and relationships in the supply chain networks play a vital role for SCM success and it is dependent upon the cooperation of the firms as a team-work-oriented system (D.-C. Li & Dai, 2009). Jayaram *et al.*, (2008) proposed that close relationships with supply chain partners are imperative for the

success of lean strategy. The alliances/relationship category of SCM is being researched frequently and it encompasses variables such as trust, commitment, conflict, power and communications (Giunipero, et al., 2008).

The fourth category of SCM is E-commerce/World Wide Web and E-integration, E-procurement and Website content are the contents of this category. The utilization of technological tools such as, internet and EDI, as collectively in business may be described as e-commerce and SCM is revolutionized by e-commerce (Iyer, Germain, & Frankwick, 2004). According to several authors, E-commerce is a contributory factor for the future success of SCM (Grieger, 2004). Recently private and public organizations have rendered considerable attention to e-commerce and SCM because customer satisfaction and operating performance can be improved by the utilization of e-commerce and SCM (Au & Ho, 2002). In a sense the evolution of technology works as a basis for the improvement of supply chain coordination (Soroor & Tarokh, 2006) and one side the firms are becoming more responsive to their customers just because of utilization of e-commerce in SCM, however, e-commerce is also changing the structure of strategic alliance and partnership (Williams, Esper, & Ozment, 2002). Undoubtedly this category has received immense attention and there is a growing body of literature for the category.

The fifth category of SCM stands for Time-based Strategies and it contains the topics such as, just-in-time, inventory management, supply chain agility and flexibility, cycle time, postponement and supplier managed inventory (Giunipero, et al., 2008). Studies for just-in-time practices in SCM management literature are prevailing since 1980. Just-in-time practices encompass various aspects of total quality management, purchasing, and operations management in the field of SCM (Toni & Nassimbeni, 2000). Supplier managed inventory is practice for inventory management and it has been discussed widely in literature of supply chain management, besides it offers competitive advantage to the firms several other benefits are also identified in the literature of SCM, however, a number of challenges limit the benefits to the firms (Sari, 2007). ‘Supply chain flexibility’ has acquired interest of practitioners and researchers so this field is in the phase of empirical exploration (Stevenson & Spring, 2007). A growing body of literature is available for the category of time-based strategies in SCM. The research for agility issues related to SCM is growing and so far an instrument has been developed to assess the supply chain agility (X. Li, Goldsby, & Holsapple, 2009).

The sixth category of SCM is information technology and it includes IT tools such as EDI and DSS, on the whole it is the utilization of information technology in the field of SCM for networking with supply chain partners to strategic alignment (Giunipero, et al., 2008). There are several research papers those deal with

deployment of IT in SCM and generate comprehensive discussion for the role of IT in SCM. IT has a very deep impact on SCM and it generates several benefits for SCM and it is vital for the success of SCM (Auramo, Kauremaa, & Tanskanen, 2005). The digital revolution has also revolutionized the field of SCM and e-SCM can serve as a competitive advantage for a firm (Folinas, Manthou, Sigala, & Vlachopoulou, 2004), so much significance of IT in SCM provoked the researchers to investigate it to such an extent that it is distinguished as a separate category of SCM. IT is supporting the firms to meet their demand for a higher degree of integration of the business processes of all supply chain partners and in other words IT is also playing its role as one the main drivers of change in SCM (Evangelista & Sweeney, 2006) while scope of business is being expanded because of the advancement in information technology (Rahman, 2004).

The seventh category of SCM is concerned with the quality aspects and it contains ISO and quality management practices supply chain. Undoubtedly the quality stands as vital factor for the firms to attain competitive advantage in the global market; however, practitioners believe that true TQM be supposed to prevail in entire supply chain and operation management literature widely discuss the quality management practices in SCM (Lo & Yeung, 2006). Moreover, quality is said to be one of the most imperative factor for the firms in the context of their relationship with customers and suppliers (Azar, Kahnali, & Taghavi, 2009). Kannan and Tan (2005) have concluded that there is a linkage between TQM and SCM at strategic level and the firms can exploit the synergy of TQM and SCM. In short, the research findings for TQM in SCM evidently confirm it as a separate category of SCM.

The eighth category of supply chain management is supplier development/selection and management. It comprises of supplier selection criteria, supplier training and improvement, supplier monitoring, management and assessment (Giunipero, et al., 2008). In Japan supplier development programs have been successful strategic moves over the past 50 year (Giannakis, 2008) and supplier development has emerged as a very important category of SCM and more than a few research issues pertinent to supplier development have been investigated for the last decade (Shokri, Nabhani, & Hodgson, 2010). Daniel R. Krause is a very renowned name for supplier development research, supplier development has been declared as strategic weapon and several activities for the supplier development practices are also reported in the literature (Krause, 1999). So the research works for supplier development in SCM make it possible to declare it as a separate category of supply chain management.

The ninth category of SCM is concerned about ethical, environmental and social responsibility faced by the firms for supply chain management. Recently

environmental issues are receiving more attention, moreover; green supply chain management, sustainable supply chain management, integrated supply chain management and substance supply chain management are the terminologies in SCM due to consideration of the environment (Tsai & Hung, 2009) as well as today's supply chains are facing challenges for responding to growing social demands (Park-Poaps & Rees, 2010) and ultimately supply chain responsibility is evolving out of corporate social responsibility (Spence & Bourlakis, 2009). There is an enhancement for acceptance of corporate social responsibly to be a new norm for multinational production networks (Smith, Palazzo, & Bhattacharya, 2010).

Third party logistics and contract management composes the tenth category of SCM named as outsourcing. A competitive advantage can be achieved and sustained by exercising outsourcing for supply chain processes and this aspect attracted the interest of academic world and practitioners for the farther exploration about outsourcing (Bolumole, 2001). The intense globalized competition demands for diminished order cycle times and inventory levels so that it generates a strong need for effective processes depending upon effective supply chain alliances through outsourcing (Bolumole, 2001). Boer *et al.* (2006) concludes that there is a lack of perspective and practical models to express outsourcing decision processes particularly for logistic activities of supply chain so this category of SCM needs more exploration to fill the research gaps. Buyer behavior in supply chain and international/global supply chain are respectively twelfth and thirteenth categories of SCM dealing respective to the topics such as new product development, information flows, organizational decision processes, and global logistics, cultural issues, international trade, global supply and demand (Giunipero, et al., 2008).

5. Conclusion

Undoubtedly, SCM is assisting firms to gain competitive advantage; therefore, the firms can compete effectively in the global business environment. Development and implementation of more effective SCM can possibly be practiced with a consensus definition of supply chain management. Specifically, the review of pertinent literature has identified a dire need to study supply chain management in the textile/apparel industry of a developing country, so that a workable framework of SCM in textile/apparel industry of a developing country can be produced. The categories of SCM as well, provide the guide line for the future research; moreover, lesser studied categories of supply chain management are potential areas for future research.

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DETERMINANTS OF EXECUTIVE COMPENSATION AND ITS IMPACT ON ORGANIZATIONAL PERFORMANCE

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ABSTRACT
The purpose of this study is to develop and test a model of the determinants of executive compensation and its impact on organizational performance for a unique sample of Pakistani Companies. A questionnaire was developed for the proposed study and was used to measure Executive Compensation against these determinants. The sample consists of 63 executives from the organizations of Pakistan i.e., Islamabad, Lahore and Karachi. The result indicated that measures job complexity, employer's ability to pay and executive human capital gives details of a significant explanation of the variance in the executive compensation. After data collection process, the given data was tabulated. Data was analyzed through Regression Analysis, Multiple Regression Analysis and Correlation tests. Collectively the independent variables accounted for almost 67% of the variance. The result indicates that company size is closely related to job complexity and employer's ability to pay. Both these variables succeed to capture the variance in executive compensation accounted for company size.

Keywords: Executive compensation, Organizational Performance, Job Complexity, Regression Analysis, Pakistani Companies.

1. INTRODUCTION
The issue of executive compensation packages has always remained very important. The issue of more privileges to the executives and their contribution in the performance of the company always remained under discussion. The transparency of the privileges being offered to the executives remained doubtful. Significance of this

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issue is complicated given the wide spread private understanding of the over payment to the executives in the form of executive compensation. Executive compensation is taken as the motivational factor for the executives who also determine the direction of the organization. Executive compensation plays fundamental role in company's performance and output. Executive compensation is the only way to retain the right people in the top management. By being perceived as an employer of choice and by providing the right incentives to key executive and top management, companies are able to attract and retain the right people while optimizing their employee cost. Since 2002 the corporate disasters has highlighted awareness of the issue regarding facilities being provided to the executives (Bolton *et a*l. (2005).

Several researchers focus on determining the sound relationship between level of the pay with the corporate performance, board structure, specific executive duties and organization size (see, Hijazi and Bhatti, 2007). However, the question, which arises here, is that what are those policies and circumstances which determine the executive compensation. This paper will be able to guide companies formulate their compensation policies. The following factors seem putting significant impact on the executive compensation packages i.e.,

a. Executive job Complexity
b. Executive human capital
c. Employer's ability to pay

The objective of this paper is to formulate and validate a model of the determinants of executive compensation and its impact on organizational performance as a proto-type for Pakistani Companies. The main research questions are:

- What are the impacts of the compensation on the performance of organization? and
- What compensation enhances the performance of an organization and why?

Based on the objective, the present study seeks to test the following hypothesis:

H1: There is a direct relationship between Job complexity and executive compensation.

H1a: There is a direct relationship between span of control and executive compensation.

H1b: There is a direct relationship between functional diversity and executive compensation.

H1c: There is a direct relationship between management levels and executive compensation.

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H1d: There is a direct relationship between geographical diversity and executive compensation.

H2: There is a direct relationship between employer's ability to pay and executive compensation.

H1a: There is a direct relationship between profit and executive compensation.

H2b: There is a direct relationship between rate of return and executive compensation.

H3: There is a direct relationship between executive human capital and executive compensation.

H3a: There is a direct relationship between educational level and executive compensation.

H3b: There is a direct relationship between field of study and executive compensation.

H3c: There is a direct relationship between work experience and executive compensation.

The paper is organized as follows: after introduction which is provided in Section 1 above, a historical and environmental perspective of human resource management describe in Section 2. Literature review is carried out in Section 3. Methodological framework is explained in Section 4. Results are shown in Section 5. Final section concludes the study.

2. A HISTORICAL AND ENVIRONMENTAL PERSPECTIVE ON HUMAN RESOURCE MANAGEMENT (HRM)

The HRM function started getting attention and focus as research began to question the notion the job satisfaction and productivity are strongly related. In the US, the civil rights movement of the 1960s produced a good deal of legislation bearing on employment relationships. Further, the increase in discrimination-based litigation during the 1970s boosted the legitimacy of the HRM function in organizations. Quite apart from various US-based interventions, it is the rise of international competition in a global market that may finally liberate human resources management from second-class status. In view of increasingly and fiercely competitive global markets, the critical need for using employees as a competitive resource has become increasingly evident (Ivancevich and Glueck, 1990). The international competition has led to four conceptual trends in the HRM function:-

- The need to link human resources to the strategic management process
- The need to select, train, and compensate individuals to function in an international marketplace
- The need to understand the political dynamics that undermine rational

HRM decision-marking processes.

- The need to provide quantitative estimates of the money value contributions made by the human resources department.

The legal environment serves as the filter and as the ultimate mechanism for merging fact and value in society. When you examine legislation enacted during the human relations movement, you will note that it dealt extensively with wages and work hours. It also dealt with union/management relations within the organization. It provided for supervising those relations, i.e, the rights of employees to organize and bargain collectively vis-à-vis the rights of the employer and the union. In the US, these laws are still in force, but the federal laws enacted during the 1960s and 70s dealt more directly with the rights of the individual (or of classes of individuals, such as minorities and women) in a wide range of issues concerning employer rights (Silveira, 2009).

As the environment creates uncertainty, how can managers adequately plan, organize, and control to deal with uncertainty? Organizations should develop a number of strategies, including forecasting and buffering. Forecasting attempts to anticipate change before it occurs. Buffering is concrete designing structural devices (such as larger or more specialized organizational units) and technological work-flow devices (such as new or more complex procedures). These buffering devices assist the organization to be both proactive and to shield itself from the pressures of the environment. They both ease schedules and help managers to figure out the nature of the environmental pressures so that they can try to make sense of them. As a manager, you often need more time and information to deal with emerging events. Once you reasonably assess the strength or potential impact of these pressures and resources for coping with them, you are in a sound position to safeguard the organization. The notion of buffering seems to have been taken up by many organizations in response to actual or potential pressures of the legal environment. As a result, larger, more specialized human resources departments handle legal requirements concerning the rights of employees (Daily, 1994). The HRM function (or any other function), in designing buffering devices, draw son the resources of the organization and place greater responsibility on that function to meet its organizational. Therefore, HRM has to protect or shield the organization from errors commission or omission in the management of its human resources. As this obligation carries with it increased visibility and risk for their function, human resources professionals have been at times as heroes and at other times as traitors (Saiyadain, 2003).

3. LITERATURE REVIEW

Today's, a number of organizations are continuously seeking new strategies to meet both organizational and employee needs. From a global perspective there are still substantial differences in the way people get paid. However, organizations are finding that their human resource strategy can be structured using similar philosophies to reward people regardless of where they are located. The logic of market-based economies suggests that the differences are narrowing as employers worldwide cope with similar pressures. All are affected by intense competition for critical skills, or influenced by global financial markets. Executive compensation is generally recognized as a key variable in executive motivation, which can have great significance for the activities and direction of the organization (Finkelstein and Hambrick, 1988 and Hoskisson et al. 1989).

The executive compensation literature is dominated by studies of the for-profit sector. The major theme of this literature focuses on the pay-for-performance issue and theory development based on agency theory (Eisenhardt, 1989 and Jensen and Meckling, 1976). Agency theory suggests that the incentives of the executive (the agent) can be aligned with the preferences of stockholders (the principals in for-profit corporations) through compensation arrangements that reward executives for firm performance (Fama and Jensen, 1983 and Jensen and Meckling, 1976).

The bulk of the studies from this research stream show a positive relationship between pay and performance, although the observed effect sizes have frequently been quite small. In the most comprehensive meta-analysis to date, Tosi et al. (2000) reported that performance accounts for less than 5 percent of the variance in executive pay, whereas firm size accounts for more than 40 percent. In addition, the pay-for-performance relationship has been shown to be extremely sensitive to the manner in which both compensation and performance are conceptualized and measured (Gray and Canella, 1997). Nevertheless, the results so far provide considerable support for agency theory. Bender (2002) examines the link between executive compensation and the organization strategy. He opines that this link of compensation with strategy was substantiated by the fact that the two companies, apparently facing a similar heavily regulated environment had chosen very different compensation policies. Each had the traditional components of salary, short-term and long-term performance related elements, but the way they configured these components was very different. At first sight this made little sense but during the course of the interviews the very different strategic aims they were following became apparent and it was clear how the chosen compensation schemes fitted in with these strategies. Simon (1987) proposed a more sociological explanation of the empirical relationship between executive compensation and organization size based on three factors: -

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a. Authority relationship within the organization generates a hierarchal structure that is roughly pyramidal in form and comprises of many management levels.

b. Companies follow a widely established practice of appropriate salary differentials between an executive and his immediate subordinate. The differential is measured in ratios rather than in absolute form.

c. Due to the influence of the competitive market forces, companies tend to pay broadly similar salaries at the lowest level in the management hierarchy.

The above discussion confirms a strong linkage between executive compensation and organizational performance. This paper will assist organizations and most of the executives to understand the factors, which affect their compensation strategies, which in turn affect their organizational performance, specifically in the context of Pakistan.

4. RESEARCH METHODOLOGY

The variables of the study have been defined as follows:-

i. Organization Size is defined with respect to the job complexity and employer's ability to pay.

a. Job Complexity: Measures of executive job complexity that would be used in our study will be as follows;-

- Span of control (the number of persons directly supervised).
- Functional divisions (The number of functional divisions over which the executive has direct responsibility).
- Management level (the number of lower management level which the executive indirectly supervised).
- Geographical diversity (the number of different states in which the executive's organizational unit conduct business operation).

b. Employer's Ability to Pay: The two indicators, which will measure the employer ability to pay, will be as follows:-

- Total profit (net operating gain before tax and dividend).
- Rate of return (the ratio of total profit to assets).

ii. **Executive's Human Capital**: The following measures of the human capital of executive are employed in this study:-

- Educational level (matriculation, intermediate, bachelor, master or higher).
- Field of Study (Business, non business)

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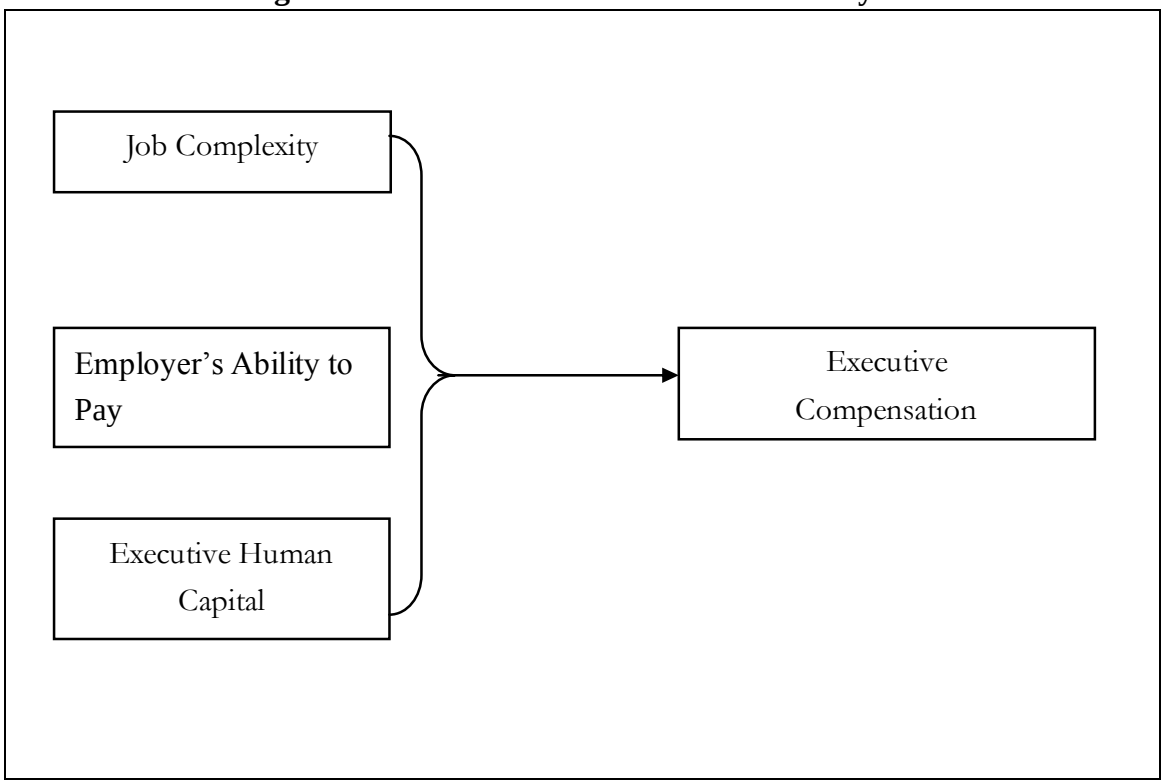
- Work experience (in years)

iii. Executive Compensation: It is defined in terms of only direct cash payments, which are cash plus bonuses. Practically it is evident that executive receives a large variety of payments in the form of stock options, stock grants pensions but the process of computing the present income equivalent of such payments is bound to be very complex and subject to errors. The two measures were regressed separately on a common set of independent variables. It was found that there is no significant difference between the results of two cases. This indicates a high correlation between these measures.

A questionnaire was developed for the proposed study and was used to measure Executive Compensation against these determinants. The sample consists of 63 executives from the organizations of Islamabad, Lahore and Karachi. After data collection process, the given data was tabulated in the SPSS software for finding multiple regression, t-test and Correlation tests. The theoretical framework of this research is shown in **Figure 1**.

Figure 1: Theoretical Framework of the Study



Source: Self extracted.

There are four equations in which we examine the relationship between the executive compensation and organizational performance in the context of Pakistan companies.

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EC=A+E 1 X1+E2 X2+E3X3 + E-4X-4 + E5 X-5 + E 6 X 6 + E 7 X 7 + E 8 X 8 + E 9 X 9 + E
(1)
EC = A +E 1 X1+E2+X2+E3X3 + E-4X-4 + E5 X-5 + E 6 X 6 + E
(2)
EC = A +E 1 X1+E2+X2+E3X3 + E-4X-4 + E5 X-5 + E 6 X 6 + E 10 X 10 + E
(3)
EC = A + E10 X 10 + E (4)
EC = A + E 10 X 10 E 1 X1+E2+X2+E3X3 + E-4X-4 + E5 X-5 + E 6 X 6 + E (5)

Where as

EC = Executive Compensation
A = Intercept
X1 = Span of Control
X2 = Functional Divisions
X3 = Management Levels
X4 = Geographical Diversity
X5 = Total Profit
X6 = Rate of Return
X7 = Education Level
X8 = Field of Study (Dummy Variable)
X9 = Work Experience
X10 = Organization Size
E = Unknown Factors / Error Term

5. EMPIRICAL RESULTS

The empirical results, given in **Table 1**, appear to be very good in terms of the usual diagnostic statistics. The value of R adjusted indicates that 67.4% variation in dependent variable has been explained by variations in independent variables. F value is higher than its critical value suggesting a good overall significance of the estimated model. Therefore, fitness of the model is acceptable empirically.

Table 1: Ordinary Least Square (OLS) Results

Dependent Variable: Executive Compensation

Independent Variables	**Coefficient Values**	**P Value**
Job Complexity		
Span of Control	0.250949**	0.03525
Functional Divisions	0.182095***	0.086295
Management Levels	0.35058	0.122548

Geographical Diversity	0.422848**	0.04652
Employer Ability to Pay		
Profit	0.18744*	0.005816
Rate of return	0.333668**	0.019609
Executive Human Capital		
Educational Level	0.259426**	0.045007
Field of Study	0.127078**	0.019992
Work Experience	0.442917**	0.044278
R Adjusted R^2 F-statistics	0.738 0.674 9.421*	

Note: *, ** and *** indicates 1, 5 and 10 percent significant level

The results further reveal that there has been positive impact of Job complexity, employer ability to pay and human capital on executive compensation. The beta coefficient of three of the four job complexity measures namely, span of control functional divisions and management levels are statistically significant. Thus, the complexity of the job over-shoots, when the executive tends to get handsome salary / compensation. The beta coefficient of locus of control is significant than management levels. Apparently indirect supervisory responsibilities exert a greater impact on executive compensation. Employer's ability to pay is also significantly related to executive compensation. In fact the beta coefficient of the total profit indicating its crucial importance as a determinant of executive compensation. Finally, among the executive human capital variables, work experience, field of study and education is significantly related to executive compensation. Such a sample would display a more limited variability in educational level. For example 92% of the respondents in the present sample have a masters degree or higher than master degree.

Two tests were run out to determine that whether the company size serve as a composite proxy measure for the two explanatory variables i.e., job complexity and employer's ability to pay. First correlation coefficients were computed between company size and each of the job complexity measures and profit (see, **Table 2**).

Table 2 shows that organizational size has a positive and significant impact on span of control, functional diversity and total profit. While the rest of the variables shows insignificant and weaker correlation with organizational size.

Table 2: Correlation Matrix

	SC	**FD**	**ML**	**GD**	**TP**	**RR**	**EL**	**F ST**	**EC**	**O SIZE**
SC	1									

FD	0.576	1								
ML	0.305	0547	1							
GD	0.301	0.318	0.352	1						
TP	0.429	0.594	0.292	0.078	1					
RR	-0.27	-0.041	0.138	0.253	0.306	1				
EL	0.079	0.025	0.01	0.122	0.109	0.014	1			
F St	-0.03	-0.054	0.02	-0.061	-0.094	0.216	0.313	1		
EC	0.527	0.238	0.378	0.34	0.346	-0.13	0.294	-0.094	1	
O Size	0.401	0.532	0.122	0.106	0.616	-0.05	0.153	0.1765	0.106	1

Second the stepwise regression analysis was undertaken to test the proposed explanation more directly. For the result see **Table 3**. Firstly (equation 2), executive compensation is regressed on the four job difficulty gauge and turnover. The proportion of difference (R^2) in executive compensation accounted for these variables is 59.3 percent. Secondly (equation 3) when the company size is added to the list of explanatory variables, the resultant increments in R^2 is only about 2.7 percentage point.

Table 3: Stepwise Regression Results

Dependent Variable: Executive Compensation

Equation	**Independent Variable**	**R^2**
2	Job Complexity, Profit	0.59
3	Job Complexity, Profit and Company Size	0.62
4	Company Size	0.51
5	Company Size, Job Complexity Profit	0.62

This indicates that company size fails to add considerably to the discrepancy in the executive compensation already deliberated upon by job difficulty and employer capability to pay. An additional stepwise deterioration was run with the autonomous variables added in the reverse order. When company size was first used as the only independent variable (equation 4), R^2 is 0.510, with the addition of job complexity measure and profit at the second step (Equation 5), the R^2 increased markedly by 11 percentage points from equation 4. This not only serves the job complexity successfully, but incarcerates the discrepancy in executive compensation explained by company size; they also make an impendent significant contribution.

6. CONCLUSION AND RECOMMENDATION

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The objective of this research is to examine the relationship between executive compensation and organizational performance in Pakistani companies. The primary hypothesis, that measure job complexity, employer's ability to pay and executive human capital explain a significant explanation of the variance in executive compensation is augmented by the regression results.

Our empirical results lead to major conclusions:

- The objective of a compensation system is to create a system of rewards that is equitable to the employer and employee alike, so that the employee is attracted to the work and motivated to do a good job for the employer.
- Executive Compensation is function of three basic factors i.e. job complexity, employer's ability to pay and Executive Human Capital. These three factors have a significant relationship with executive compensation.
- Executive compensation is generally recognized as a key variable in motivating the executives and the number of management levels is directly proportional to executive's salary.
- Shortage of executive talent compels organizations to give higher salaries to attract executives. Therefore, the employer's ability to pay is also directly proportional to executive compensation.
- Employer's ability to pay is determined by total profit and rate of return.
- Job complexity, employer's ability to pay and executive human capital accounts for almost 67 percent of variance in the executive compensation.
- Company size is closely related to job complexity and employer's ability to pay.
- Employer's ability to pay is determined by the total profit and ratio of total profit to the assets of the organization.

The methods for paying employees on the basis of output are usually referred to as incentive forms of compensation. Incentives can be paid individually, to the work group, or an enterprise wide basis. Incentive compensation assumes it is possible and useful to tie performance directly to pay.

6.1. Recommendations

Although the three basic factors of executive compensation i.e., job complexity, employers ability to pay and executive human capital play a key role in the compensation package for the executives but one of the most important factor is the out put that an executive produces. At the end of the year organizational leaders are interested in how the performance of an executive has contributed to higher rate of return. The better the organization performs the higher should be the executive compensation. On the other hand if the organization is not performing up to the desired standard the executive be paid accordingly.

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- When the executives are under performing and are paid big bonuses and higher salaries that would harm the organization in the long run. Thus excessive rewards to low performing executives are also not recommended.
- Executives can also be compensated with shares of the company along with cash rewards in case an organization is performing well. Other incentives which can be given are generous retirement plan, health insurance, interest free loan and housing facilities.
- Political factors also play an important role in deciding the executive compensation. Executive compensation became an important issue in US presidential elections. Similarly executives of third world countries are also affected by political factors. Executive compensation should be purely a performance based organizational matter not involving politics. One important factor, which should be covered, is the ratio of pay of an executive in comparison with the lowest paid worker. Growing disparity between the pay of an executive and the average worker is always a point of concern for the public and media / politicians.
- The criteria for executive compensation in larger firms is different as compared to small ones since larger organizations pay more and are less sensitive to performance. A smaller organization pays less and demands more therefore, government needs to have a check on such organizations. This could benefit not only the executives but the low paid workers also
- What makes an effective executive is the ability to get the right thing done this usually involves doing what other people overlook. Intelligence, imagination and knowledge may all be wasted in an executive job if the executive is not motivated. One of the big sources of motivation is executive compensation. Therefore, there is a direct need that the executive salary is in consonance with the hard work and effort that he/she puts in for the organization.
- A company with a clear vision, unique ideas and more products has much better chance of attracting the best executives. Generally executives are swayed by a unique and challenging opportunity not just an attractive compensation package.
- Performance incentives prove very special in the outcome an organization. Shares of stock, cash vocatives and other bonuses tied to the performance of department or business can horst the profit of an organization. Performance incentives linked to long term goals create vision that it can inspire an executive to remain committed to a company.

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Application of ε-Restricted Method to Determine Pareto-Optimal Solutions in Public Facilities Location Problem

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Abstract

Decisions on locating public facilities are critical elements in urban management that are made in response to society as a whole. Emergency services, school systems, postal facilities, hospitals, etc, are categorized as public facilities. This paper presents a multi-objective mathematical formulation for locating these facilities. Considered objective functions are: minimizing average time traveled and minimizing costs. Also, a ε-Restricted based algorithm for determining pareto-optimal solutions is developed. The applicability of the procedure is illustrated via a numerical example.

1. Introduction

Facility location means locating a set of facilities in order to minimize the cost of satisfying some set of demand (of the customers) subject to some set of constraints. Facility location decisions are critical elements in strategic planning for a wide range of private and public firms. The branches of locating facilities are broad, influencing numerous operational and logistical decisions [3].

Facility location problems are generally discussed in different categories. Cohon [4], divided facility location problems into two main classes:

- Facility location in public sector
- Facility location in private sections

Private and public sector location problems are the same in that they try to maximizing some measures of utility to the owners and satisfying some constraints. But the way of formulating their objectives and constraints is different. In fact they differ because the ownership is different. Emergency services, school systems, postal facilities, hospitals etc, are categorized as public facilities. Public facility decisions are made in response to society as a whole, and the objective here is to maximize a benefit or minimize a cost which is unquantifiable (See [5],[6],[7],[8]). Since these objectives are difficult to measure, they are frequently surrogated by some objective functions like:

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minimization of the locational and operational costs needed for full coverage, or the search for maximal coverage or minimization of travel time or distance and etc. [9].

The purpose of this paper is to present a multi-objective mathematical model for locating public facilities and develop an algorithm to determine pareto-optimal solutions. The algorithm is based on ε-restricted method.

In next section, the ε-restricted method is described. In section 3, the proposed mathematical formulation is presented and the solution procedure is presented in section 4. Applicability of proposed procedure is illustrated using a numerical example in section 5. Finally, the paper is concluded in section 6.

2. ε-Restricted Algorithm

The **ε**-Restrict algorithm approximates the set of Pareto optimal solutions (or Pareto-frontier) by using an iterative scheme [2]. Based on mathematical models and dividing range between best and worst value of objective functions, **ε**-Restrict method determines the pareto-optimal points.

The algorithm has two phases (see Figure 1).

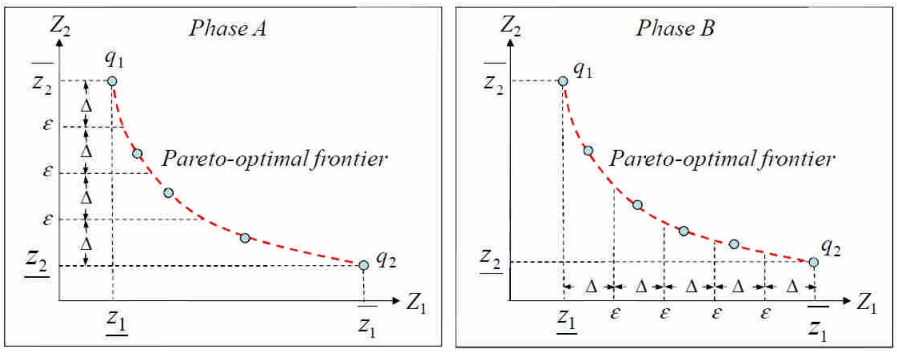

Fig. 1. ε -Restrict algorithm: Phases A and B [2].

3. Mathematical Model

In related literature, different objective functions are discussed for locating public facilities (see [1]). In this section a multi-objective model is represented that can be useful for locating public facilities. The proposed mathematical model consists of two objectives; the first one is minimizing average time traveled and the second objective function is minimizing costs.

3.1. Notations

I Set of demand points

J	Set of eligible facility sites
N_i	$=\{j \mid d_{ji} \le S\}$ with d_{ji} is shortest distance from potential facility location j to demand node i, and S is standard distance for coverage
p	Number of facilities to be deployed
t_{ij}^{av}	Average travel time between demand point i and facility j
a_i	The population at demand node i
c_j	Fixed cost associated with site j
o_j	Annual operating cost associated with site j
x_j	$=\begin{cases}1 & \text{if a facilty is located at node } j \\ 0 & \text{Otherwise}\end{cases}$
x'_{ij}	$=\begin{cases}1 & \text{if travel time should be calculated} \\ 0 & \text{Otherwise}\end{cases}$

3.2. Minimizing average time traveled from demand point to facility

The mathematical model for this objective is:

$$\min \ Z_1 = \sum_{i \in I} \sum_{j \in N_i} t_{ij}^{av} x'_{ij}$$

$$\text{subject to}:$$

$$x_j \le x'_{ij} \qquad \forall i \in I, j \in N_i \tag{1}$$

$$\sum_{j \in J} x_j = p$$

$$x_j, x'_{ij} \in \{0,1\} \qquad \forall j \in J, i \in I$$

3.3. Minimizing fixed cost and total annual operating cost

According to the notations, this objective function will be as follow:

$$\min \ Z_2 = \sum_{j \in J} c_j x_j + \sum_{j \in J} o_j x_j \tag{2}$$

4. Solution procedure

Considering proposed mathematical model and based on **ε**-Restrict method, following steps are used to determine pareto-optimal solutions. The best solution among pareto-optimal solutions depends on utility function of decision maker.

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Step1: Find the extreme point $q_1 = (\underline{Z_1}, \overline{Z_2})$ of the Pareto-optimal frontier, where:

$$
\begin{aligned}
&\underline{Z_1} = \min Z_1 \\
&subject\ to: \\
&x_j \le x'_{ij} \qquad \forall i \in I,\ j \in N_i \\
&\sum_{j \in J} x_j = p \\
&x_j, x'_{ij} \in \{0,1\} \qquad \forall j \in J, i \in I \\
&\overline{Z_2} = \min Z_2 \\
&subject\ to: \\
&x_j \le x'_{ij} \qquad \forall i \in I,\ j \in N_i \\
&\sum_{j \in J} x_j = p \\
&x_j, x'_{ij} \in \{0,1\} \qquad \forall j \in J, i \in I \\
&Z_1 \le \underline{Z_1}
\end{aligned}
\tag{3}
$$

Step 2: Determines the minimum value of Z_2 $(\underline{Z_2})$, solving the model:

$$
\begin{aligned}
&\underline{Z_2} = \min Z_2 \\
&subject\ to: \\
&x_j \le x'_{ij} \qquad \forall i \in I,\ j \in N_i \\
&\sum_{j \in J} x_j = p \\
&x_j, x'_{ij} \in \{0,1\} \qquad \forall j \in J, i \in I
\end{aligned}
\tag{4}
$$

Step 3: Divide the range $\overline{Z_2} - \underline{Z_2}$ in s equally sized intervals. The size of each interval is determined by $\Delta = (\overline{Z_2} - \underline{Z_2}) / s$.

Step 4: Start the iterative scheme with the upper bound $\varepsilon = \overline{Z_2} - \Delta$ for Z_2 and determine a new Pareto-optimal point $q = (Z_1^*, Z_2^*)$ solving the following models:

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$$
\begin{aligned}
& Z_1^* = \min Z_1 \\
& subject\ to: \\
& x_j \le x'_{ij} \qquad \forall i \in I,\ j \in N_i \\
& \sum_{j \in J} x_j = p \\
& x_j, x'_{ij} \in \{0,1\} \qquad \forall j \in J, i \in I \\
& Z_2 \le \varepsilon \\
& Z_2^* = \min Z_2 \\
& subject\ to: \\
& x_j \le x'_{ij} \qquad \forall i \in I,\ j \in N_i \\
& \sum_{j \in J} x_j = p \\
& x_j, x'_{ij} \in \{0,1\} \qquad \forall j \in J, i \in I \\
& Z_1 \le Z_1^*
\end{aligned}
\tag{5}
$$

Other points are determined considering the upper bounds:

$\varepsilon = \overline{Z_2} - K\Delta$, $K = 2,\ldots,s.$. This step finishes when $\varepsilon = Z_2$.

Step 5: determine other extreme point $q_2 = (\overline{Z_1}, \underline{Z_2})$ of the Pareto-optimal frontier and new Pareto-optimal points $q = (Z_1^*, Z_2^*)$ are determined solving the following models:

$$
\begin{aligned}
& Z_2^* = \min Z_2 \\
& subject\ to: \\
& x_j \le x'_{ij} \qquad \forall i \in I,\ j \in N_i \\
& \sum_{j \in J} x_j = p \\
& x_j, x'_{ij} \in \{0,1\} \qquad \forall j \in J, i \in I \\
& Z_1 \le \varepsilon \\
& Z_1^* = \min Z_1 \\
& subject\ to: \\
& x_j \le x'_{ij} \qquad \forall i \in I,\ j \in N_i \\
& \sum_{j \in J} x_j = p \\
& x_j, x'_{ij} \in \{0,1\} \qquad \forall j \in J, i \in I \\
& Z_2 \le Z_2^*
\end{aligned}
\tag{6}
$$

5. Numerical Example

Consider the following data:

p=4 and a_1=120, a_2=50, a_3=180, a_4=210, s=10

TABLE 1

INPUT PARAMETERS OF NUMERICAL EXAMPLE

J	c_j	o_j	Average travel time to demand point (i)			
			1	2	3	4
1	100	60	1	3	3.5	3.6
2	250	40	0.5	4.5	2.5	1
3	85	30	4	2	4	1
4	140	70	2	4	4	3
5	310	100	4	0.5	3	2
6	90	40	2.5	4	2.5	4
7	120	60	2	1	2.5	0.5
8	300	120	3	4	1	0.5

After solving this numerical example using GAMS software pareto-optimal solutions will be:

TABLE 2

PARETO- OPTIMAL SOLUTIONS

	Z_1^*	Z_2^*	Optimal sites
1	33.5	1300	2,5,7,8
2	34	1005	2,3,7,8
3	36	995	2,3,5,7
4	36.6	745	1,2,3,7
5	38.5	715	2,3,6,7
6	41.1	585	1,3,6,7

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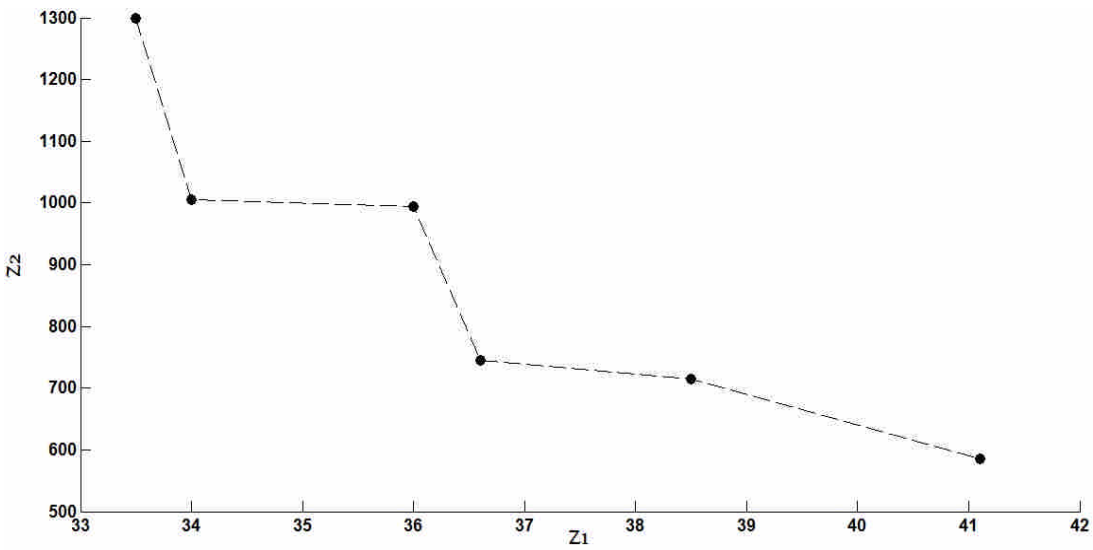

Fig. 2. Pareto optimal solutions

6. Conclusion

In this paper a multi-objective model for public facilities location problem was presented. The proposed model consists of two objective functions. To determine the pareto optimal solutions, a ε-restricted based algorithm was developed. Implementation of proposed procedure was illustrated via a numerical example.

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An Empirical Investigation of Corporate Voluntary Disclosure of Management's Responsibilities in the Bangladeshi Listed Companies

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Abstract

This research aims to evaluate the Corporate Voluntary Disclosure of Management's Responsibilities in the Bangladeshi Listed Companies. Data are taken from annual reports of the listed companies in Dhaka Stock Exchange (DSE) during the period 2005 to 2008. The study is used ordinary least squares regression model to examine the relationship between explanatory variables and corporate voluntary disclosure and un-weighted relative disclosure index is used for measuring voluntary disclosure score. The results show the firms have the higher percentage of shares held by institutional shareholders, senior management's decision is positively related to the level of voluntary disclosure and also positive relation with a board audit committee and board leadership structure. On the other hand, firm have a higher management of ownership structure, senior management's decision is negatively related to the level of voluntary disclosure. However, other factors such as those provided by board composition, board size and firm size displayed no significant influence on senior management's decisions in this area.

Keywords: Management's Responsibility, Corporate Governance, Voluntary Disclosure

1. Introduction

Corporate voluntary disclosures, being in excess of requirements, represents free choices on the part of Management's Responsibility to provide information in the annual reports for the maintenance of an effective system of internal controls. Understanding why companies disclose information voluntary is useful to both preparers and users of accounting information, as well as to accounting policy makers (Meek, Roberts and Gray, 1995). Nevertheless, many researchers in this area have focused on the development markets (McKinnon and Dalimunthe, 1993; Frost and Pownall, 1994). Only a few studies have examined voluntary disclosure in the Asian region e.g. (Hongxia Li& Ainian Qi, 2008; Ibrahim, Haron and Ariffin, 2000; Ho and Wong, 200; Chau and Gray, 2002; Haniffa and Cooke, 2002; Eng and Mark, 2003) and thus evidence of the determinants of voluntary disclosure in this region is limited as compared to evidence from the developed countries. In this present paper is

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investigated the Corporate Voluntary Disclosure of Management's Responsibilities in the Bangladeshi Listed Companies.

Generally, disclosure is done in company annual reports either through the statements or notes accompanying the statements. Although other means of releasing information, such as interim reporting, letters to shareholders and employee reports, are used by the companies, the annual report is considered to be the major source of information to various user-groups (Marston & Shrives, 1991).Nevertheless, all parts of the annual reports are not equally important to all users. Income statement is believed to be the most preferred sections to investors while cash flow statement and balance sheet are most useful sections to bankers and creditors (Ho & Wong, 2001). Likewise, users of accounting information weight audit reports, directors' reports, accounting policies and historical summary differently. The annual report should contain information that will allow its users to make correct decisions and efficient use of limited resources.

Companies provide information on the ground that such disclosure will not respond to the negative impact on the company image (Choi, 1973). It is seen that a company discloses information in line with legislative frameworks (Karim, 1998). Brownlee (1990) argue that regulatory agencies should be more concerned with the full and fair disclosure of information than with the specific accounting methods used to measure or report economic transactions. The companies Act 1994 provides the basic requirements for disclosure and reporting applicable to all companies incorporated in Bangladesh (Government of Bangladesh, 1993).The Act requires companies to prepare financial statements in order to reflect a true and fair view of the state of affairs of the company. The Securities and Exchange Commission (SEC), another regulatory body, requires all listed companies to comply with accounting standards promulgated by the Institute of Chartered Accountants of Bangladesh (ICAB) in addition to its own disclosure provisions (Government of Bangladesh, 1993).

The demand for published financial information of companies has increased worldwide as users of the information become more aware. But often disclosure does not serve the need of the users because managers are likely to consider their own interests when exercising managerial judgment. In fact, this might enhance the disclosure gap–the difference between expected and actual disclosures. In other words, improved disclosure reduces the gap between management and the outside world, enhances the value of stock in the capital market, increases liquidity, reduces cost and so on (Karim, 1996).One great feature in corporate reporting is that a company generally provides information to discharge specific obligations: to society, investor, supplier, creditors and legal authorities. However senior management's decision to provide or not provide certain information is likely to be influenced by a variety of factors of the corporation. Earlier research examines various company attributes and

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their association to the level of disclosure. Here, the study focuses the level of disclosure linking to board composition, board ownership structure, board leadership structure, board size, board audit committee, firm size, and profitability.

2. Objectives of the Study

Generally, two kinds of information is disclosed in corporate annual reports for traditional user groups such as shareholders, creditors, financial analysis and security consultants, one is mandatory information and another is voluntary information. Moreover, prior research focuses mostly on mandatory disclosure (Ahmed, K. & Nicholls, D.,1994; Wallace, R.S.O., & Naser, K.,1995); Owusa-Ansah, S.,1998; Akhtaruddin M., 2005). This paper is an attempt to minimize this apparent gap in prior research by investigating the voluntary disclosure made by listed companies in Bangladesh and examining the factors that have influenced senior management's decision to disclosure voluntary information in their annual reports. The findings of the study would be of immense interest to listed companies, investors and those involved in standard setting processes. The specific objectives of the proposed study are: (i) To measure the level of voluntary disclosure of information made by the listed companies in Bangladesh. (ii) To examine the management's decision to disclosure voluntary information in their annual reports.

3. Literature Review and Hypothesis Development

3.1 Independent Non-executive Directors

Independent non-executive directors are members whose only affiliation with the firm is their directorship. Empirical evidence on the importance of non-executive directors on board has been mixed. Kosnik (1990) argues that outside directors are more effective than inside directors in maximizing shareholders' wealth. Ho and Wong (2001) do not find association between the proportion of outside non-executive directors and the extent of voluntary disclosure. Leftwich, Watts and Zimmerman (1981) demonstrate that firms can expect more voluntary disclosure with the inclusion of a larger number of independent non-executive directors on the board. Haniffa and Cooke (2002) argue that an independent board serves as an important check and balance mechanism in enhancing boards' effectiveness. Support for these assertions is further provided by Barako et al. (2006); Simon and Kar (2001); Pettigrew and McNulty (1995) and Eng and Mak (2003). Ho and Wong (2001) do not find association between the proportion of outside non-executive directors and the extent of voluntary disclosure. Aktaruddin et al. (2009) and Obeua Persons (2009) find that firms can expect more voluntary disclosure with the inclusion of a larger number of independent non-executive directors on the board. A firm may have higher level of

disclosure if the boards consist of more outside directors. These observations suggest the following hypothesis:

H_1: A higher proportion of independent non-executive directors on a board are positively related management's decision to the level of voluntary disclosure.

3.2 Ownership Structure

Ownership structure is a mechanism that aligns the interest of shareholders and managers (Eng and Mak, 2003; Haniffa and Cooke, 2002; Chau and Gray, 2002; Hassain, et al.,1994). The agency theory suggests that where there is a separation of ownership and control of a firm, the potential for agency costs arises because of conflicts of interest between contracting parties. It is believed that agency problems will be higher in the widely held companies because of the diverse interests between contracting parties (Mohd, et al.2006). By utilizing voluntary disclosure, managers provide more information to signal that they work in the best interests of shareholders. In this study, ownership structure is proxy by management ownership. Using agency theory, it is argued that firms with higher management of ownership structure may disclose less information to shareholders through voluntary disclosure. It is because the determined ownership structure provides firms lower incentives to voluntarily disclose information to meet the needs of non-dispersed shareholders groups. McKinnon and Dalimunthe(1993) note that companies with a single ownership structure disclose more voluntary information. Hossain et al.(1994) suggested a negative association between management ownership structure and the level of voluntary disclosure by Malaysian listed firms. In addition, Lakhal (2005) proposes that share management ownership is statistically and negatively associated to voluntary earnings disclosures. Oliveira et al (2006) also reported that firms with a lower shareholder management voluntarily disclose more information. The significant role of management ownership in influencing voluntary disclosures practices of firms from the prior researcher. So, it is expected that ownership structure will influence the voluntary disclosure information. The hypothesis is formally stated as:

H_2: The extent of corporate voluntary disclosures is negatively associated with a higher management of ownership structure.

Due to the large ownership stake, institutional investors have strong incentives to monitor corporate disclosure practices. Thus, managers may voluntarily disclose information to meet the expectations of large share-holders. Dulacha G .B (2007) found that there is a significant positive

relationship between the percentage ownership by institutional investors and voluntary disclosure of corporate governance practices by listed companies in Kenyan. Similarly, Bushee and Noe (2000) documented a significant positive association between institutional shareholdings and corporate disclosure practices, as measured by the Association for Investment Management and Research (AIMR).Given shareholder activism and the monitoring potential of institutional shareholders, the following hypothesis is tested:

H_3: The higher the percentage of shares held by institutional shareholders, senior management's decision to the higher the extent of voluntary disclosure.

3.3: Board Audit Committee

The presence of an audit committee is associated with reliable financial reporting, such as, reduced incidence of errors, irregularities, and other indicators of unreliable reporting (Ho and Wong, 2001; McMullen, 1996). In addition, Bradbury (1990) argued that audit committees are commonly viewed as monitoring mechanisms that enhance the audit attestation function of external financial reporting. The board usually delegates responsibility for the oversight of financial reporting to the audit committee to enhance the breadth of relevance and reliability of annual report (Wallace et al., 1995). Thus, audit committees can be a monitoring mechanism that improves the quality of information flow between firm owners (shareholders and potential shareholders) and managers, especially in the financial reporting environment where the two have disparate information levels. Given the influence of audit committees on the context and content of corporate annual reports, the following hypothesis is tested:

H_4: The firms have an audit committee, senior management's decision to the higher level of voluntary disclosure.

3.4: Board Leadership Structure

Within the context of corporate governance, the central issue often discussed is whether the chair of the board of directors and CEO positions should be held by different persons (dual leadership structure) or by one person (unitary leadership structure). According to agency theory, the combined functions (unitary leadership structure) can significantly impair the boards' most important function of monitoring, disciplining and

compensating senior managers. It also enables the CEO to engage in opportunistic behavior, because of his/her dominance over the board. Forker (1992) empirically studied the relationship between corporate governance and disclosure quality, and presented evidence of a negative relationship between disclosure quality and 'dominant personality' (measured as CEO and board chair combined). Hence, to the extent that the combined chair/CEO positions "signals the absence of separation of decision management and decision control" (Dulacha, G.B (2007) , the following hypothesis is examined:

H_5: The firms have a dual leadership structure; senior management's decision is positively related to the extent of voluntary disclosure.

3.5: Board Size

Board size may influence the level of voluntary disclosure. The level of disclosure is a strategic decision made of the board of directors. As a top-level management body, the board of directors formulates policies and strategies to be followed by managers. It has been argued that a greater number of directors on the board may reduce the likelihood of information asymmetry (Chen and Jaggi, 2000). Research emphasizes the importance of strategic information and resources in a highly uncertain environment. Birnbaum (1984) suggests that uncertainty and the lack of information may be minimized by a larger board. The size of the board is believed to affect the ability of the board to monitor and evaluate management and small board encourages faster information processing (Zahra, et al., 2000). Further, the ability of directors to control and promote value-creating activities is more likely to increase with the increase of directors on the board. With more directors, the collective experience and expertise of the board will increase, and therefore, the need for information disclosure will be higher. The following hypothesis is examined:

H_6: The higher number of directors on a board, senior management's decision is positively related to the level of voluntary disclosure.

3.6 Other Control Variables

A review of the literature on voluntary disclosure led to the decision to include these control variables in the multiple regression models for testing the main hypotheses. These are firm size, (Prior studies have identified size as significantly associated with the level of disclosure (Cooke, 1993 Lang & Lundholm, 1993 and Lobo & Zhou; 2001) Profitability, Previous research used profitably as a determinant of disclosure in

corporate annual reports (Wallance & Naser, 1995; karim, 1996. However, empirical results of the research are mixed Finding of karim, 1996; Owusu-Ansah, 1998.

4. Research Design and Methodology

4.1 Disclosure Index Construction and Application

In the initial stage of this research, comprehensive list of items that may be voluntary disclosed by companies in their annual reports was identified. The list of disclosure items included both financial and non-financial items that may be relevant to investment decision-making, and which listed companies may disclosed. Since the focus of this research is voluntary disclosures, the preliminary list of 91 items was subjected to a through selection to eliminate those that are mandated. This list was sent to various experts (professor, Professional Chartered accounted & Cost and Management accounted etc.) for selection and as a result of their feedback, the initial list of 91 items was reduced to 68 items. The disclosure items are classified into thirteen categories: general corporate information, corporate strategic information, corporate governance information, financial information, financial review information, foreign currency information, segmental information, employee information, research & development information, future forecast information, share price information, social responsibility information and graphical information. This study is employed an un-weighted approach for this study. This approach is most appropriate when no importance is given to any specific user-groups (Hossain et al., 1994; Akhtaruddin et al., 2009; Hossain and Hammami, 2009). The items of information are numerically scored on a dichotomous basis. According to the un-weighted disclosure approach, a firm is scored “1” for an item disclosed in the annual report and “0” if it is not disclosed. The Total Voluntary Disclosure Index (TVDI) is then computed for each sample firm as a ratio of the total disclosure score to the maximum possible disclosure by the firm. The disclosure index for each firm is then expressed as a percentage.

4.2 Sample Selection and Data Sources

Sample is taken from annual reports of 132 listed companies on Dhaka Stock Exchange (DSE), all companies were considered for inclusive in the survey. The main criteria used for sampling the firms were: (i) annual reports must be available at the stock exchange and (ii) the firm must have been listed for the entire period of the study 2005 to 2008.The companies listed on the DSE are classified into thirteen categories, just have taken here seventh categories i.e. engineering, food& allied, fuel & power, textile, pharmaceuticals & chemicals, tannery & paper and cement & ceramics. Corporate-governance attributes was collected from the annual reports of listed companies of DSE. Table-1 provides a summary of the operational definition of variable and their sources.

4.3 Analysis of Data

In order to obtain the objectives of the research study, statistical tools like average, standard deviation, co-efficient of variance, correlation, regressions and T tests, F tests have been used to analyze and interpretation of the data through the Statistical Packages for Social Science(SPSS)14.0 for windows and Tables have been used for data presentation.

4.4 Model Specification

The economic model used in multiple regression analysis is given as:

$Y = \beta 0 + \beta\ Fit + eit$ (1)

Where, Y is the dependent variable. $\beta 0$ is constant, β is the coefficient of the explanatory variable (corporate governance mechanisms), Fit is the explanatory variable and eit is the error term (assumed to have zero mean and independent across time period).By adopting the economic model as in equation (1) above specifically to this study, equation (2) below evolves.

$$TVD = \beta 0 + \beta_1 PIND + \beta_2 PEOI + \beta_3 PEINS + \beta_4\ BAC + \beta_5\ BLS + \beta_6\ BSZE + + \beta_7\ TA + \beta_8\ TSE + \beta_7\ PROA + eit \quad (2)$$

<u>Dependent Variables</u>

TVD = Total Voluntary Disclosure score received from each Company

<u>Independent Variables</u>

PIND =Percentage of Independent Non-executive Directors to the Total Number of Directors on the Board.

PEOI =Percentage of Equity Owned by the Insiders to all Equity of the Firm as Ownership Structure.

PEINS = Percentage of Equity held by Institutional Shareholders to all Equity of the Firm

BAC = Board Audit Committee, 1 for presence or 0 others

BLS = Board Leadership Structure, 1 for duel or 0 others

BSZE = Total Number of Member on each Board.

TA = Total Assets of the Firm.

TSE = Total Sales of the Firm.

PROA = Percentage of Return on Assets as Net Profit to Total Assets

Table-1: Operational definitions of variable, expected signs and Relationship in the

regression

Vent variable	Operational definition	Source of information	Expected sign and relationship
TVDE	Total voluntary disclosure index	Company annual reports	Index
β_1PIND	Percentage of independent directors to the total number of directors on the board	Company annual reports	(+) PIND has positively associated with the level of voluntary disclosure.
β_2PEOI	Percentage of equity owned by the insiders to all equity of the firm	Company annual reports	(-)PEOI is negatively associated with the level of voluntary disclosure.
β_3PEINS	Percentage of equity held by institutional shareholders to all equity of the firm	Company annual reports	(+)PEINS is positively associated with the level of voluntary disclosure.
β_4BAC	Dichotomous, 1 or 0	Company annual reports	(+)BAC is associated positively with the level of voluntary disclosure.
β_5BLS	Dichotomous, 1 or 0	Company annual reports	(+)BLS is positively related to the level of voluntary disclosure.
β_6BSZE	Total number of directors	Company annual reports	(+) BSZE has a significant positive relationship with the level of voluntary disclosure.
β_7TA	Total assets represent the size of firms.	Company annual reports	(+) TA is associated positively with the level of disclosure.
β_8TSE	Total sales represent the size of firms.	Company annual reports	(+) TSE is associated positively with the level of disclosure.
β_9PROA	Percentage of Return on Assets as net profit to Total Assets	Company annual reports	(+) PROA is associated positively with the level of disclosure.

5. Results and Discussion

Table-2: Descriptive Statistics for all Variables (N=132)

Variables	**Mean**	**Median**	**Std. Deviation**	**Minimum**	**Maximum**

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TVD	47.25	47.00	12.12	17	75
PIND	9.94	13.00	8.617	0	38
PEOI	22.16	19.86	19.76	0	66
PINSO	27.49	24.00	18.23	0	73
BAC	0.71	1.00	0.456	0	1
BLS	0.70	1.00	0.461	0	1
BSIZ	6.66	6.00	2.06	3	13
TA	25671.88	4813.13	65430.44	56.95	378056.50
TSE	17744.69	4817.38	58582.90	0.00	-258.96
PROA	-1.23	3.55	38.79	441016.71	64.09

Table-3: Voluntary Disclosure Level (N=132)

Disclosure Score (%)	No. of Companies (%)
<=30	12(9.09)
31-40	19(14.39)
41-50	51(38.64)
51-60	28(21.21)
61-70	17(12.88)
71-80	5(3.79)
>80	0(0.00)

The table-3 shows the number and percentages of companies whose disclosure score is within the specified range.

Table-4: Pearson Correlation analysis results (N=132)

Variables	TVD	PIND	PEOI	PINSO	BAC	BLS	BSIZ	TA	TSE	PROA
TVD	1	.224	-.717	.471	.544	.496	.351	.329	.186	.066
PIND	-.224	1	-.201	-.050	.518	.211	.122	.061	.142	.060
PEOI	-.717	-.201	1	-.338	-.509	-.378)	-.254	-.270	.002	-.253
PINSO	.471	-.050	-.338	1	.190	.358	.223	.289	.323	.118
BAC	.544	.518	-.509	.190	1	.355	.228	.174	.168	.139
BLS	.496	.211	-.378	.358	.355	1	.221	.198	.163	.240
BSIZ	.351	.122	-.254	.223	.228	.221	1	.298	.232	.207
TA	.329	.061	-.270	.289	.174	.198	.298	1	.577	.146
TSE	.186	.142	.002	.323	.168	.163	.232	.577	1	.066
PROA	.066	.060	-.253	.118	.139	.240	.207	.146	.066	1
Sig. (2-tailed) TVD		.131	.000	.000	.000	.000	.001	.001	.104	.531
PIND	.131		.053	.633	.000	.042	.243	.563	.174	.571
PEOI	.000	.053		.001	.000	.000	.014	.009	.987	.016

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PINSO	.000	.633	.001		.069	.000	.032	.005	.002	.266
BAC	.000	.000	.000	.069		.000	.028	.095	.108	.190
BLS	.000	.042	.000	.000	.000		.033	.057	.118	.022
BSIZ	.001	.243	.014	.032	.028	.033		.004	.025	.048
TA	.001	.563	.009	.005	.095	.057	.004		.000	.168
TSE	.104	.174	.987	.002	.108	.118	.025	.000		.534
PROA	.531	.571	.016	.266	.190	.022	.048	.168	.534	

PIND = Percentage of Independent Non-executive Directors, PEOI = Percentage of Equity Owned by the Insiders, PEINS = Percentage of Equity held by Institutional Shareholders, BAC = Board Audit Committee, BLS = Board Leadership Structure, BSZE = Total Number of Member on each Board, TA = Total Assets of the Firm, TSE = Total Sales of the Firm, PROA = Percentage of Return on Assets

Table-5: Regression Analysis Results (N=132)

Variables	Coefficients	Std. Error	Beta t value	Significance
PIND	-.013	.107	-.172	.864
PEOI	-.494	.052	-5.762	.000***
PINSO	.178	.050	2.282	.025**
BAC	.184	2.284	2.113	.038**
BLS	.186	1.945	2.475	.015**
BSIZ	.117	.409	1.650	.103
TA	.057	.000	.665	.508
TSE	.027	.000	.303	.763
PROA	-.183	.021	-2.634	.010*

* P<0.01, two tailed, ** P<0.05, two tailed, *** P<0.001, two-tailed

R squire =0.652; Adjusted R squire= 0.674; F Value =16.899; F significance =.000 ; Durbin Watson test =1.711

PIND = Percentage of Independent Non-executive Directors, PEOI = Percentage of Equity Owned by the Insiders, PEINS = Percentage of Equity held by Institutional Shareholders, BAC = Board Audit Committee, BLS = Board Leadership Structure, BSZE = Total Number of Member on each Board, TA = Total Assets of the Firm, TSE = Total Sales of the Firm, PROA = Percentage of Return on Assets

5.1 Descriptive Statistics

Table–2 presents descriptive statistics for the sample firms. The results from the disclosure index indicate (TVD) the highest score achieved by a firm is 75% and the lowest score is 17% with a standard deviation of 12.12%. So the management's

decisions of the firms are positively distributed with regard to voluntary disclosure. The mean of the proportion of independent non-executive directors (PIND) to the directors on the board is 9.94% with standard deviation is 8.61%.The average board ownership structure is 22.16% with standard deviation19.76%.The mean of institutional ownership structure is 27.49% with standard deviation 18.23%.The average BAC, BLS and BSZE is 0.71;0.70 and 6.66 respectively. The average firm size is (Taka Bangladeshi) Tk.25671.88 lakh and Tk.17744.69 lakh respectively in terms of total assets (TA) and total sales (TSE).The statistics on Percentage of Return on Assets (PROA) indicate that a small portion of sample firms show negative returns.

5.2 Result of Correlation Analysis

Table-4 provides the Pearson product-moment correlation coefficients of the continuous explanatory variables as well as the dependent variable included in the survey. The result of Pearson product-moment correlation exposed that Total Voluntary Disclosure (TVD) is positively correlated with Percentage of Equity held by Institutional Shareholders (PEINS), Board Audit Committee (BAC), Board Leadership Structure (BLS) and is significant (sig.0.000). Similar results appear for Board Size (BSIZE) and Total Assets (TA) at the level of significance (sig.0.001).On the other hand, TVD has negative relationship with Percentage of Equity Owned by the Insiders (PEOI) and is significant (sig.0.000) and Similar results appear for Percentage of Independent Directors(PIND) but not significant(sig.0.131). However, TVD has a positive relationship with total sales (TS) and Percentage of Return on Assets (PROA) but not significant respectively (sig.0.104; 0.531).

5.3 Results of Multiple Regression Analysis

The table shows the association between voluntary disclosure index and experimental variables. The coefficient of coordination R-square, F ratio, beta coefficients and t-statistics for the regression model and summarized results of the dependent variable on the explanatory variables can be seen in the table-5.The result indicate an R-square of 0.652, and an F value of 16.899, which is significant at the 0.000 levels. Both of these values suggest that a significant percentage of the variation in voluntary disclosure can be explained by the variations in the whole set of independent variables.

The results of the multiple regressions and indicates TVD is a negative relation with Percentage of Equity Owned by the Insiders (PEOI) at 1% level of significant(result similar to Hossain et al.1994; Lakhal ,2005) and positive relation with Percentage of Equity held by Institutional Shareholders (PEINS), Board Audit Committee (BAC),

Board Leadership Structure (BLS) at 5% level of significant. This outcome has the support of Ho and Wong, 2001; McMullen, 1996; Dulacha, G. B, 2007; Chen and Jaggi, 2000; Wallace et al., 1995.

With regard to controllable variable, this study suggests that Percentage of Return on Assets as Net Profit (PROA) is negatively associated with the level of disclosure at 10% significant level.

6. Conclusions and Implication for Further Study

The study finds that a diverse set of factors influenced senior management to voluntarily disclose its responsibilities during the period 2005 to 2008. The findings have implications for current professional practice and are an important addition to existing literature in the area of voluntary disclosure and disclosure strategy. The firms have the higher percentage of shares held by institutional shareholders, have a board audit committee and board leadership structure, senior management's decision is positively related to the level of voluntary disclosure. On the other hand, firm have a higher management of ownership structure, senior management's decision is negatively related to the level of voluntary disclosure. However, other factors such as those provided by board composition, board size and firm size displayed no significant influence on senior management's decisions in this area.

A sample size of 132 non-financial firms listed on the Dhaka Stock Exchange (DSE). Panel data methodology is employed; the method of analysis is multiple regressions and the method of regression is OLS.

There are a number of limitations of this study as well. First limitation of the study is used only non-financial companies as a sample. So the results may not extend across all companies in Bangladesh. Second, the researchers' constructed disclosure index has been used in the study. The index is very sensitive and can affect the results if the selected items of information improperly. The results of the study should be interpreted with these limitations in mind. Future research on voluntary disclosure should seek to take into account all listed companies under financial and non-financial group.

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Appendix-1:

Voluntary Disclosure Check List

1. General Corporate Information	**6. Foreign Currency Information**
1. Company's mission statement	37. Effects of foreign currency fluctuations on future operation-qualitative
2. Brief history of the company	38. Effects of foreign currency fluctuations on current results-qualitative
3. Corporate structure / chart	**7. Segmental Information**
4. Description of major goods/services produced	39. Competitor analysis- quantitative
5. Stock exchanges on which shares are held	40. Competitor analysis- qualitative
2. Corporate Strategic Information	41. Market share analysis- quantitative
6. Statement of corporate strategy and objectives –general	42. Market share analysis- qualitative
7. Statement of corporate strategy and objectives –financial	**8. Employee Information**
8. Statement of corporate strategy and	43. Total number of employees for the company

objectives –marketing	44. Average compensation per employee costs
9. Statement of corporate strategy and objectives –social	45. Category of employees by sex
10. Impact of strategy on current performance	46. Number of employees trained
3. Corporate Governance/Directors Information	47. Welfare information
11. Name of principal shareholders	48. Policy on employee training
12. List of Directors	49. Data on accidents
13. Shares held by directors of the company	**9. Research and development Information**
14. Meeting held and Attendance	50. Description of Research and development projects
15. Educational qualifications of the directors	51. Corporate policy on Research and development
16. Experience of the directors	**10. Future Forecast Information**
17. Position or office held by executive directors	52. Market share forecast
18. Other directorship held by executive directors	53. Future cash flow forecast
19. Remuneration of the directors	54. Sales forecast
4. Financial Information	55. Profit forecast
20. Amount and sources of revenue	56. Compared former earnings forecast date
21. Sources of raw materials	57. Compared former sales forecast date
22. Dividend payout policy	58. Capital expenditure and R &D expenditure forecast
23. Retained earnings	**11. Share price Information**
24. Unit selling price	59. Sales amount changes and explanations
25. Growth in units sold	60. Operating income changes and explanations
26. Foreign currency information	61. Gross profit changes and explanations
27. Intangible assets break-down	62. Accounts receivables changes and explanations
28. Policies regarding the amortization of intangible assets	63. Inventory changes and explanations
5. Financial Review Information	**12. Social Responsibility Information**
29. Liquidity ratios	64. Information on safety measures
30. Debt / equity ratio	65. Environmental protection programs
31. Return on capital employed	66. Information on community services
32. Return on shareholders' equity	**13. Graphic Information**
33. Net tangible assets per share	67. Graphic presentation of financial information
34. Dividend per ordinary share for the period	68. Graphic presentation of non- financial information
35. Effects of inflation on future operations-qualitative	
36. Effects of interest rates on results	

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Identification of Factors Affecting Successful ERP Implementation in Indian SMEs

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Abstract
Today the adoption of Enterprise business applications and practices have transformed the organizations and changed the way of doing business. Enterprise Resource Planning is an integrated software solution used to manage the organizations resources. Implementation of such systems is expensive and complex. Literature shows inspite of spending much on implementation organizations had to undergo failures and frustrations while implementing such ERP systems. Today implementation of ERP has been subjected to substantial research and questions often arises can certain issues or factors can be identified that would lead to positive implementation of ERP. This paper thus attempts to identify such factors leading to implementation of ERP successful context to Indian small and medium scale enterprises.
Keywords: ERP, factors, SME, India

1. Introduction

Organizations of any magnitude have implemented and are also in the process of implementing business information systems. Enterprise Resource Planning (ERP) have emerged as the core business information systems consists of standard multifunctional, multi-language, multilegislative software modules that offer integration across an entire organization. Today one of the most mentioned

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information systems in research and business news is the ERP. It can be regarded as one of the novel business management solution and are increasingly becoming accepted platform in micro, small and medium scale industrial sector as one of the way to achieve competitive advantage and to reengineer business process [1]. Today in this competitive world organization whatever industry it belonged to cannot imagine their business without ERP system. Hardly an organization can be found which is running its business successfully without implementing ERP. In short, ERP can be considered as the snapshot of an organization. Some of the noted benefits that the organizations enjoy after implementing ERP are: Increase efficiency in overall business, improved decision making and planning, better resource utilization, improvement in labor productivity, organizational empowerment, Improvement in financial management, improved flexibility in information generation. There has been a significant growth in the use of ERP systems by small and medium scale enterprises (SMEs). In recent years ERP vendors are trying to overcome the economic cultural and basic infrastructural barrier related to developing economy. For developing countries like India ERP is in its early stage. The Indian micro small and medium scale enterprises (MSMEs) are eyeing the enterprise system solutions for their business in this changing business scenario. Today Indian SME and MSME sector both have started to adopt the ERP systems. SMEs occupy an important position in any country's economy and constituting as high as 90% of all industries in any country. SMEs are considered as the one of the principal driving forces in the economic development of every nation. The small and medium scale enterprises (SMEs) constitute an important segment of the Indian economy by contributing around 60% of GDP (Gross Domestic Product).

To implement ERP system in industries is quite difficult. While going through the literature it has come to notice about the failures that the organizations had to go through while implementing such novel information systems (i.e. ERP). Some of the notable failures are Dell, Hershley, and Fox- Meyer. As cases of ERP failures have increased many researchers have to tried to identify some issues that would lead to positive implementation of ERP. This paper thus attempts to identify those factors by capturing the experience of the people who worked for implementation process. This research study has been carried out in Indian SMEs which have already completed the implementation of ERP and few are in the process of implementation.

2. Literature Review

Duchessi et al. identified certain factors related to MRP implementation which includes: Project team composition; Project management; Business plan and vision; Top management support; Effective communication and Change management program and culture [2].

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Recently many authors have stressed on critical and important issues affecting ERP implementation which include: ERP teamwork and composition, change management, top management support, project management, BPR, and minimal customization [3, 4].

On the basis of research study with the objective of identifying some critical factors leading to successful implementation of ERP identified some factors which are: top management role, BPR, ERP consultants' role, ERP team composition and Proper training and morale [5].

A research study carried out in micro and small medium scale organizations and on the basis of empirical analysis the researchers identified six critical issues that ensure smooth and positive impact in implementation of ERP systems. Those identified issues are: Proper goals and objectives of business, User education and training, Project team being competent, Change management, Assistance from vendor, External consultants role [6].

Poonam Garg. identified and validated the critical success factors empirically for ensuring successful implementation of ERP packages in the context of retail industry in India. The identified Top management commitment, Product selection, Project management, Team composition and Training and education are considered as the most important issues [7].

On the basis of qualitative research study Upadhyay et al. identified some issues for positive implementation of ERP applicable for SMEs but not for large scale organizations. The identified issues are: Clearly defined goals and scope of implementation, Proper project planning, Proper implementation strategy and Minimal customization [8].

A research study carried out in Indian small and medium scale enterprises by Basu et al. revealed some most influencing critical factors leading to successful implementation of ERP which includes: User knowledge, ERP importance, Interdepartmental communication, Proper selection of package, ERP team composition, Project champion [9].

On the basis of survey based research study carried out by Basu et al. in Indian SMEs and identified certain critical issues for successful implementation of ERP, the issues are: Support from top management, Properly defined goals and objectives, Effective

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education and training, Proper project management, ERP Consultant, Data accuracy, Project team composition, Change management, Effective communication [10].

3. Research Objective and Methodology

Certain factors have been found to be critical in context to implementation of Information system projects. This study have tried to identify certain critical issues that the organizations should focus on to be successful. Identifying critical issues is important as it allows firms to focus their
efforts on building their system to meet those issues and it even allow firms to decide if they have the capability to build the requirements necessary to meet critical success factors. The different issues were identified after doing an extensive literature study and from the questionnaire survey of organizations that have gone through the implementation process. The content validity of these constructs was tentatively established by extensive review with top executives and other stakeholders. Some items were removed from the construct if their removal results in an increase in the reliability estimates, however care was taken to ensure the validity of the measures is not threatened by the removal of a key conceptual element. The different issues on further investigations identified are: ERP team composition, Support from top management, Project management, BPR, Minimal customization, Education & training, Clear goals and objectives, Effective communication, User knowledge, Cost of package, Vendor support and Role of external consultants.

Survey Methodology

Invitations to participate in the survey requested responses from those who have basically worked for Indian small and medium scale organizations. The researchers therefore created items to measure the constructs, and used five-point multi-item, Liker-type scales for each item where “1” meant “Strongly Disagree” and “5” meant “Strongly Agree.” The questionnaire has been focused based on the issues that clarified from the literature review and from the questionnaire survey of the organizations. It identifies the respondents’ perception of the importance of CSFs in the ERP implementation process. For each of these factors, a number of elements or statements were formulated through the definition and description of each one in the literature.

Data Collection Procedures

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The target respondent in each firm was the chief information officer (CIO), the director of MIS, IT Manager or any person responsible for ERP System since they are directly involved in ERP system. Overall, 120 responses were obtained for analysis. A wide variety of industries were represented in the responses.

Table 1. Number of companies

Education	10
Retail	10
Pharmaceuticals	15
Manufacturing	50
Health	5
IT	5
Financial Services	10
Total	**105**

4. Data Analysis and Results

We performed the analysis and for each variables (identified as factors) mean and standard deviation have been calculated.

Table 2. Mean ranking of Issues by degree of importance in ERP implementation

Factors	N	Mean	Std. Deviation
ERP team composition	120	3.78	.700
Support from top management	120	3.82	.550
Project management	120	3.85	.461
BPR	120	3.74	.558
Minimal customization	120	3.95	.219
Education & training	120	3.96	.201
Clear goals & objectives	120	4.06	.416
Effective communication	120	3.48	1.100
User knowledge	120	3.13	1.073

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Cost of package	120	3.71	1.133
Vendor support	120	3.57	1.121
Role of external consultants	120	3.57	1.121

Here, with the objective of establishing the reliability of data collected and that of the study, Cronbach's alpha of the data pertaining to the factors was calculated. The value was found to be 0.718, which is well above the minimum required level suggested by Hair et al. [11] and this validates the reliability of our study.

All the variables in the study were entered into an exploratory factor analysis. The researchers have considered those factors having Eigen value greater than one (see appendix 1) and also from the rotated matrix (see appendix 2) as per higher factor loading we have seen that Vendor support, Role of external consultants, Project management, Minimal customization and Cost of package are the major factors that contribute to implementation successful. This shows that to successfully implement ERP in organizations the above mentioned factors must be given careful attention.

5. Conclusion

This study attempts to highlight those factors that the management must take into consideration while implementing such novel information systems like ERP. This finding is significant for ERP vendors and more so in present economic scenario where the SME's have to be convinced regarding the return on their investment as a result of their investment in ERP packages. The participation of external consultants and adequate vendor support even after implementation are other crucial factors underlying successful implementations of ERP projects in SMEs. The management in SME's tend to ignore this aspect as they consider these as an additional cost to their already incurred cost of purchasing the package. Management can negotiate with the vendors and arrive at an acceptable price for engaging external consultants. This study provides a partial support and guidelines for the explanation of success in implementing ERP projects. The outcome of this research would be beneficial to organizations of any magnitude which wishes to leverage the benefits of integrating the systems. There is a scope to enhance this study by extending number of respondents and industries into consideration.

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Appendix 1.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.614	30.116	30.116	3.614	30.116	30.116
2	2.528	21.069	51.185	2.528	21.069	51.185
3	1.250	10.413	61.598	1.250	10.413	61.598
4	1.038	8.649	70.247	1.038	8.649	70.247
5	.938	7.816	78.063			
6	.734	6.115	84.178			
7	.637	5.306	89.485			
8	.451	3.760	93.245			
9	.383	3.194	96.439			
10	.361	3.008	99.447			
11	.066	.553	100.000			
12	-6.384E-16	-5.320E-15	100.000			

Extraction Method: Principal Component Analysis.

Appendix 2.

Rotated Component Matrix[a]

	Component			
	1	2	3	4
ERP team composition	.081	.169	.519	-.373
Support from top management	-.068	.793	.160	.025
Project management	.011	.832	.108	.105
BPR	.289	.715	.159	-.077
Minimal customization	.037	.476	.804	-.027
Education &amp: training	.075	.492	.707	-.020
Clear goals and objectives	.023	-.096	.800	.213
Effective communication	.506	-.202	.120	.622
User knowledge	.633	-.016	.110	.231
Cost of package	.118	.204	.004	.785
Vendor support	.048	.121	.002	.020
Role of external consultants	.048	.121	.002	.020

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

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AN IVESTIGATION OF THE RELATIONSHIP BETWEEN SALES PROMOTION AND ORGANISATION'S SALES VOLUME EXPECTATION

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1. ABSTRACT

This study explores the relationship between sales promotion and organisation's sales volume expectation using UAC Foods, a subsidiary of UACN Plc. The study shows the impact of sales promotion on organisation's revenue and profit. The study uses survey research design and collected primary data through questionnaire. In order to achieve the objective of the study, research questions were formulated and two hypotheses were advanced. Data were presented through tabulation, simple percentage and descriptive statistics. Hypotheses were tested through analysis of variance, correlation coefficient and regression. The result shows significant relationship between sales promotion and organisation's sales volume and that sales promotion can prolong the life of a product. This ultimately leads to increase in organisation's profits.

KEY WORDS: Sales promotion, sales volume, organisation's revenue and profit, advertising, personal selling.

2. INTRODUCTION

Customers are the back bone of any organisation. This is because without customers, the organisation can not succeed (Drucker, 1954). In order to satisfy or encourage these highly valuable customers for their patronage and to patronise the company more, organisations do offer different forms of marketing promotions, which in the long run will help to boosts their sales volume. This occurs because a customer that is compensated or gets an encouragement for buying a particular product, buys more the next time he purchases the goods which will result in high sales and eventually an increase in the overall sales volume (Armstrong and Kotler , 1996). Sales promotion

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is an important component of business's overall marketing communication strategy, along with advertising, public relations, personal selling, and direct marketing (Kotler, 2000). Sales promotion is one of the most critical factors determining organisational marketing success especially when the product reaches growth and maturity stages in its life cycle. Many companies have not really known the importance of sales promotion in improving organisation revenue and profit drive. The reason again is because many managers of resources do not know the actual impact of sales promotion on an organisation's sales volume at least in the short run (Dolak, 2008; Belgh and Belgh 2004).

The issue of sales promotion has assumed a position of centrality and universality in marketing communication. Sales promotion has become an increasingly important aspect of doing business in the world today. The importance of sales promotion is evident by the level of attention it has received over the last few decades. The relationship between sales promotion and firm's sales volume expectation has been the subject of abundant research in marketing field (Gupta, 1999; Chandon, Brian, and Laurnt, 2000; Kotler, 2001; Kerin, Hartley, and Rudelliuns, 2001). However, many researchers concurred on the fact that there is no agreement on the precise nature of the relationship between sales promotion and organisation's sales volume expectation. Huff and Alden (1998) say that sales promotions have large immediate sales effect but do not long last. In his own study, Kotler (2001) says sales promotion increases organisation's sales volume, while Gilbert and Jackaria (2002) observe that sales are not constantly high after sales promotion is over. The empirical evidences emerging from various studies about the effect of sales promotion on organisation's sales volume expectation have so far yielded mixed results. Because of these contradictory results, the question of whether sales promotion improves organisation's sales volume expectation is still worthy of further research. In addition, despite the existence of these studies, very little attention has been given to the developing countries. This means that there is a major gap in the relevant literature on developing countries including Nigeria, which has to be covered by research. This research attempts to fill this gap by studying the situation of the Nigerian companies, using United African Company of Nigeria (UACN) Foods as the case study, and provide more empirical evidence on the effects of sales promotion on organisation's sales volume expectation. It is against this backdrop that this paper tries to provide answers to the following research questions: (i) Is sales promotion important to a company revenue and profit drive? (ii) Can the use of sales promotion lead to increase in an organisation sales volume? (iii) Will the use of sales promotion help to prolong the life of a product at growth and maturity stages? To this ends, two alternative hypotheses were advanced:

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(i) There is a positive relationship between sales promotion and organisation's sales volume. (ii) There is a positive relationship between sales promotion and longevity of a product life at growth and maturity stages.

3. REVIEW OF LITERATURE

3.1 Conceptual Framework of Sales Promotion

Sales promotion is one of the most loosely used terms in the marketing vocabulary. Kerin et al. (2001) define sales promotion as demand stimulating devices designed to supplement advertising and facilitate personal selling. In other words, sales promotion signifies all those activities that supplement, co-ordinate and make the efforts of personal selling and advertising more effective. It is non recurrent in nature which means it can't be used continuously. One should add that effective sales promotion increases the basic value of a product for a limited time and directly stimulates consumer purchasing, selling effectiveness, or the effort of the sales force. It can be used to inform, persuade, and remind target customers about the business and its marketing mix. Some common types of sales promotion include samples, coupons, sweepstakes, contests, in-store displays, trade shows, price-off deals, premiums, and rebates (Armstrong and Kotler, 1996). Sales promotion efforts are directed at final consumers and designed to motivate, persuade and remind them of the goods that are offered. Sales persons adopt several techniques for sales promotion. Creative sales promotion can be very effective. It is the marketing manager's responsibility to specify promotion objectives and policies. A sales promotion is a programme that is designed to increase the sales of a product or service in the short term. The focus of such a programme is to stimulate customers to take a specific action—namely, to buy the product. Many sales promotions are aimed directly at consumers, however, sales promotion is not limited to consumer products marketing. A variety of sales promotion tactics can be aimed at retail and other channel partners (referred to as "trade promotions"), and a more limited number are also used in business-to-business markets. The strength of the retail trade puts increasing emphasis on trade and consumer promotions (Kotler, 2001). Sales promotion consists of diverse collection of incentive tools, mostly short-term designed to stimulate quicker and /or greater purchase of a particular product by consumers or the trade, where as advertising offers a reason to buy, sales promotion offers an incentive to buy. Sales promotion includes tools for consumer promotion (for example samples, coupons, prizes, cash refund, warranties, demonstrations, contest); trade promotion (for example buying allowances, free goods, merchandise allowances, co-operative advertising, advertising and display allowances, dealer sales contests); and sales-force promotion (for example bonuses, contests, sales rallies) (Gupta, 1999).

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3.2 Development of Sales Promotion

Sales promotion embraces a variety of tactical promotion tools of a short-term incentive nature designed to stimulate earlier and/or stronger market response (Ojo, 2009). Sales promotion tools are used by most organisations, including manufacturers, distributors, retailers, trade associations and non profit institutions. They are targeted toward final buyers (consumer promotion), business customers (business promotion), retailers and wholesalers (trade promotion), and members of the sales force (sales force promotion). Today in many consumer packaged goods companies, sales promotion accounts for 75 percent or more of all marketing expenditures. Sales promotion expenditures have been increasing by 12 percent annually, compared with advertising increase of only 7.6 percent (Kotler, 2000).

Several factors have contributed to the rapid growth of sale promotion, particularly in consumer markets. First, inside the company, product manager face greater pressures to increase their current sales, and promotion is viewed as an effective short-run sales tool. Second, externally, the company faces more competition and competing brands are less differentiated. Increasingly, competitors are using sales promotion to help differentiate their offers. Third, advertising efficiency has declined because of rising cost, media clutter and legal restraints. Finally, consumers have become more deal oriented and retailers are demanding more deal from manufacturers (Kotler, 2000).

The growing use of sales promotion has resulted in promotion clutter, similar to advertising clutter. Consumers are increasingly tuning out promotions, weakening their ability to trigger immediate purchase.

3.3 Purpose of Sales Promotion

Sales promotion tools vary in their specific objectives. A free sample stimulates consumer trial, while a free management advisory service cements a long-term relationship with a retailer. From the marketer's perspective, sales promotion serves three essential roles; it informs, persuades and reminds prospective and current customers and other selected audiences about a company and its products (Kotler, 2000). The relative importance of those roles varies according to the circumstances faced by a firm.

The most useful product or brand will be a failure if no one knows it is available. Because distribution channels are often long, a product may pass through many hands between a producer and consumers. Therefore, a producer must inform middlemen as

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well as the ultimate consumers or business users about the product. Wholesalers, in turn must inform retailers and retailers must inform consumers. As the number of potential customers grows and the geographic dimensions of a market expand, the problems and costs of informing the market increase. (Kotler, 2000)

Another purpose of sales promotion is persuasion. The intense competition among different industries puts tremendous pressure on the promotional programmes of sellers. In India, even a product designed to satisfy a basic physiological need requires strong persuasive promotion, because consumers have many alternatives to choose from. In the case of luxury product, for which sales depend on the ability to convince consumers that the products benefits exceed those of other luxuries, persuasion is even more important (Etzel, Walker and Stanton, 2004).

Consumers also must be reminded about a product's availability and its potential to satisfy. Sellers bombard the market place with hundreds of messages every day in the hope of attracting new consumers and establishing markets for new products. Given the intense competition for consumers' attention, even an established firm must constantly remind people about its brand to retain a place in their minds. Much of a firm's sales promotion may be intended simply to offset competitors marketing activity by keeping its brand in front of the market. (Kerin et al., 2001).

3.4 Rationale of Sales Promotion

Rationale of sales promotion may be analysed under the following points, according to Etzel (2001).

Short-Term Results: Sales promotion such as coupons and trade allowances produce quicker, more measurable sales results. However critics of this strategy argue that these immediate benefits come at the expense of building brand equity. They believe that an over emphasise on sales promotion may under mine a brand's future

Competitive Pressure: If competitors offer buyers price reductions, contest or other incentives, a firm may feel forced to retaliate with its own sales promotions.

Buyers' Expectations: Once they are offered purchase incentives, consumers and channel members get used to them and soon begin expecting them.

Low Quality of Retail Selling: Many retailers use inadequately trained sales clerks or has switched to self service. For these outlets, sales promotion devices such as product displays and samples often are the only effective promotional tools available at the point of purchase.

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3.5 Concept of Sales Volume

According to Mela and Gupta (1997), the prime goal of any business enterprise is survival, growth and security. Although it is possible to identify other sub goals like sales optimisation etc. survival as the primary goal requires that a firm breaks even at least, that is, the revenue generated must at least cover all cost incurred in business operation.

Kotler (1999) further explain that business growth and security on the other hand, there is the need to have enough funds to sustain continuous operation of the firm as concerned. This in essence is that for a business enterprise to achieve its corporate goals, the focus must largely be on the level of revenue (sales generated).

Sales, according to Adam (2000), are the resultant effect of the exchange of goods or service for money within a specific period. A sale is products of quality demanded market price whereas, the quality sold constitute the sales volume. The market price multiply by the quality gives the sales revenue or turnover.

The level of company's sales volume are determined by some set of variables and these include

availability of fund. According to www.managemen-hub.com (2008), the amount of funds available for promotion will favour sales promotion and try to cover wider market. If the funds available are less then maximum promotion of such fund will be allocated for personal selling in a limited area. These funds may be used for widow display also.

Regardless of the most desirable promotional mix, the amount of money available for promotion is often the ultimate determinant of the mix. A business with ample funds can make more effective use of sales promotion than a firm with limited financial resources (Blattberg and Nelson, 1990).

3.6 Effectiveness of the Sales Promotion Tools

A company's total marketing communication which is also called its promotion mix consist of the specific blend of advertising, personal selling, sales promotion and public relation.

According to www.managemen-hub.com (2008), personal selling, advertising and sales promotion are some of the promotional tools. During most of the situation, two or more promotional methods are to be used for each campaign. Generally, with the help of a single method, it is not possible to succeed. Advertising needs the support of personal selling or display to increase the sales. Sometimes, even the personal selling alone cannot be successful without the support of sales promotion.

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An ideal promotional mix is that situation where the total expenditure incurred for various promotion methods is minimum and sales by such mix is maximum. Promotion mix means finding out the proper ratio of usage of different methods of promotion. The management must find out how much amount should be spent on each promotional activity.

The Nature of the Environment: The environment in which an organisation operates would affect the level of sales. An organisation must be able to produce goods and service that will be useful to the person's of the environment where it operates. An organisation operating in a particular environment and does not produce what they need will definitely affect their sales volume and in turn reduce profitability. The ethical and cultural beliefs of the people in the environment where the organisation operates will affect the level of growth of the environment. The political stability of the environment also affects the sales growth of the society where a company operates.

The Nature of the Market: Sales volume can also be affected by the nature of the market, if the demand for goods is low in an environment where an org operates, this in turn will affect the sales volume of the particular company. The demand for goods and services of people residing in the environment where an organisation operates will highly affect the profitability of the organisation.

Timing of the Sales Promotion: Timing is very important to the success of any sales promotion. Organisations carrying out sales promotion must have a good knowledge of the business period. That is when the economic is in recess or boom. Sales volume is greatly achieved during festive periods because people tend to buy more during this period.

RESEARCH HYPOTHESIS

Based on the reviewed literature above, the hypotheses of the study are:

1. **H_1**: There is a positive relationship between sales promotion and organisation's sales volume.
2. **H_1:** There is a positive relationship between sales promotion and longevity of a product life.

4. METHODOLOGY

The research design employed in this study is the descriptive survey research design in which the researcher attempts to observe the research variable as they are with no attempt to manipulate them (Ojo, 2003). The population for this study is the entire members of staff of UAC Foods in Ojota metropolis, Lagos State, Nigeria. The choice

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of this company was largely premised on accessibility and convenience and on the fact that it is the oldest company in its field of production with its headquarters office in Lagos, the commercial and economic centre of Nigeria. Samples were drawn bearing in mind the organisational level of all the respondents. The simple random sampling technique was used to select our respondents. The instrument utilised in data collection is a structured questionnaire in which the design of questionnaire benefiting from extant literature and expert opinions. Seventy-five (75) copies of the questionnaire were distributed to our selected respondents with sixty-two (62) of them reasonably and adequately completed and returned their questionnaire resulting in a response rate of 82.67%; eight (8) were returned unfilled and five (5) were not returned. Data were analysed with the use of frequency table, simple percentage and descriptive statistics, while Pearson Correlation and linear regression were used to test our hypotheses in order to take decision. All these were done using the Statistical Package for Social Science (SPSS).

5. DATA ANALYSIS

This section deals with the presentation, analysis and interpretation of data gathered in the course of the research work. The data gathered are presented using the descriptive frequency and the interpretation is based on the outcome of the analysis.

Table 1: Respondents Views on the Conducts of Sales Promotion by the Organisation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	22	35.5	35.5	35.5
	Agree	27	43.5	43.5	79.0
	Undecided	5	8.1	8.1	87.1
	Disagree	6	9.7	9.7	96.8
	Strongly Disagree	2	3.2	3.2	100.0
	Total	**62**	**100.0**	**100.0**	

Source: Field Survey, 2009

Table 1 above indicates that 35.5% of the respondents strongly agree that the company conducts sales promotion activity regularly, 43.5% of the respondents agreed, 8.1% of the respondents were undecided, 9.7% of the respondents disagreed, while the remaining 3.2% of the respondents strongly disagreed that the company conducts sales promotion activity regularly. The conclusion that can be drawn here is that overwhelming majority of the respondents agree with the statement that the company do conducts promotion activity regularly.

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Table 2: Sales Promotion Creates Awareness for the Company's Products.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	20	32.3	32.3	32.3
	Agree	32	51.6	51.6	83.9
	Undecided	7	11.3	11.3	95.2
	Disagree	3	4.8	4.8	100.0
	Total	**62**	**100.0**	**100.0**	

Source: Field Survey, 2009

From the above table, 32.3% of the respondents strongly agree with the fact that sales promotion has helped to create constant awareness of the company's products. 51.6% of the respondents agree, 11.3% of the respondents were undecided, while the remaining 4.8% of the respondents disagree with the fact that sales promotion has helped to create constant awareness of the company's products. Thus, we can comfortably say that sales promotion activity of the company has created constant awareness of the company's products to the consumers.

Table 3: Sales Promotion Increases Sales Volume of the Company.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	22	35.5	35.5	35.5
	Agree	32	51.6	51.6	87.1
	Undecided	4	6.5	6.5	93.5
	Disagree	4	6.5	6.5	100.0
	Total	**62**	**100.0**	**100.0**	

Source: Field Survey, 2009

The above table indicates that 35.5% of respondents strongly agree with the fact that sales promotion has helped to increase the sales volume of the company's products, another 51.6% of the respondents agreed with the statement, while 6.5% of the respondents were undecided and the remaining 6.5% of the respondents disagreed with the fact that sales promotion has helped to increase the sales volume of the company. The respondents' feedbacks are corroborated by the company's Annual Reports and Accounts for the year 2009 in which the company increases its profits over the previous year. The inference that can be drawn here is that sales promotion has helped to increase the sales volume of the company as confirmed by the majority of the respondents.

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Table 4: There is a Strong Relationship Between Sales Promotion and Firm's Sales Volume

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	19	30.6	30.6	30.6
	Agree	34	54.8	54.8	85.5
	Undecided	4	6.5	6.5	91.9
	Disagree	5	8.1	8.1	100.0
	Total	**62**	**100.0**	**100.0**	

Source: Field Survey, 2009

As revealed from the above table 6, 30.6% of the respondents strongly agree, 54.8% of the respondents agree, 6.5% of the respondents were undecided, while the remaining 8.1% of the respondents disagreed with the statement that there is a strong relationship between sales promotion and the firm's sales volume. This also manifested in the company's Annual Reports and Accounts for the under study. We can safely conclude here, based on respondents' feedback, that there is a strong positive relationship between sales promotion and firm's sales volume.

Table 5: Sales Promotion Activities Increases the Demand of the Company Products

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	16	25.8	25.8	25.8
	Agree	39	62.9	62.9	88.7
	Undecided	5	8.1	8.1	96.8
	Disagree	2	3.2	3.2	100.0
	Total	**62**	**100.0**	**100.0**	

Source: Field Survey, 2009

From the above table, 25.8% of the respondents strongly agreed, 62.9% of the respondents agreed, 8.1% of the respondents were undecided, while 3.2% of the respondents disagreed with the fact that sales promotion activities have helped to increase the demand of the company products. Based on the above table, overwhelming majority of the respondents are of the opinion that sales promotion increases the demand of the company's products.

Table 6: Sales Promotion Prolongs the Life of the Products of the Company.

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		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	14	22.6	22.6	22.6
	Agree	32	51.6	51.6	74.2
	Undecided	5	8.1	8.1	82.3
	Disagree	11	17.7	17.7	100.0
	Total	**62**	**100.0**	**100.0**	

Source: Field Survey, 2009

Table 9 above reveals that 22.6% of the respondents strongly agreed with the statement that sales promotion prolongs the life of the company's products at growth and maturity stages, 51.6% of the respondents agreed, 8.1% of the respondents were undecided, and the remaining 17.7% of the respondents disagreed with the fact that the use of sales promotion prolongs the life of a product at growth and maturity stages. Since overwhelming majority of the respondents' feedbacks conformed to the statement, we can conclude that sales promotion prolongs the life of a product at growth and maturity stages.

6. TESTING OF HYPOTHESES

Data analysis was carried out in the previous section. In this section we shall be concerned with the testing of the two hypotheses advanced in the introduction section of the study. The two alternative hypotheses are tested by the use of regression analysis, analysis of variance and correlation.

Hypothesis 1

H_1: There is a positive relationship between sales promotion and organisation's sales volume

Multiple R =0.777[a]

R square = 0.604

Adjusted R square = 0.576

Standard Error of the estimate = 1.295

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Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.777[a]	.604	.576	1.295

a. Predictors: (Constant), Distribution Channels are supportive of sales promtion, Sales promotion improves sales volume, Conducts sales promotion on regular basis, Marketing Objectives

R square indicates an extremely strong relationship which confirms the fact that frequent use of sales promotion can lead to an increase in a firm's sales volume. The R square which is 0.604 that is 60.4% indicates that about 61% variation of the dependent variable is explained by the model.

Adjusted R square of 0.578 shows that 57.8% variation is explained by the dependent variable thus showing a strong relationship.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	145.647	4	36.412	21.726	.000[a]
	Residual	95.531	57	1.676		
	Total	241.177	61			

a. Predictors: (Constant), Distribution Channels are supportive of sales promtion, Sales promotion improves sales volume, Conducts sales promotion on regular basis, Marketing Objectives

b. Dependent Variable: Salesvolume

Since F cal (21.726) > F tab (2.52) at 0.05 level of significance, therefore we accept our alternative hypothesis H_1 and reject our null hypothesis H_0, concluding that the use of sales promotion can lead to an increase in a firm's sales volume

Linear Regression Coefficient for Sales Promotion and Sales Volume

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Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.520	.626		.831	.409
	Sales promotion improves sales volume	1.204	.260	.461	4.635	.000
	Conducts sales promotion on regular basis	.935	.168	.500	5.557	.000
	Marketing Objectives	.557	.278	.205	2.000	.050
	Distribution Channels are supportive of sales promotion	.046	.245	.018	.187	.852

a. Dependent Variable: Sales volume

The B coefficient shows a positive relationship between sales promotion and sales volume, regularity of sales promotion and sales volume, marketing objectives and sales volume and distribution channel and sales volume. This confirms that the higher the level of these variables, the higher its significance on organisation's sales volume. We therefore accept our alternative hypothesis.

Hypothesis 2

H_1: There is a positive relationship between sales promotion and longevity of a product life.

Simple Correlation Coefficient for Sales Promotion and Product Life.

		Growth and Maturity Stages	Increase in Demand of Company product
Growth and Maturity Stage	Pearson Correlation	1	.327(**)
	Sig. (2-tailed)		.010
	N	62	62
Increase in Demand of Company product	Pearson Correlation	.327(**)	1
	Sig. (2-tailed)	.010	
	N	62	62

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

There is a positive relationship between sales promotion and longevity of a product life. It shows that sales promotion increases the product sales volume during the product life cycle. We accept the alternative hypothesis.

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7. RESULTS AND MANAGERIAL IMPLICATIONS

Some empirical findings have been noted in the analysis of data as well as in testing the research hypotheses. The results from this study include the following:

- Overwhelming majority (79.0%) of the respondents says that the company do conducts promotion activity regularly.
- That sales promotion creates customers awareness of the products of the company. This view is supported by overwhelming majority (83.92%) of the respondents. Thus, we can comfortably say that sales promotion activity of the company has created constant awareness of the company's products to the consumers.
- Another good result derived from this study is that sales promotion activities embarked on by the company has drastically helped in improving the sales volume of the organisation. This is supported by 87.1% of the respondents. The simple truth here is that organisations can increase the level of their sales volume by persistent use of sales promotion.
- Besides, the researcher also discovered that sales promotion helps in prolonging the longevity of the product life. This assertion was supported by majority (74.2%) of the respondents.
- Finally it was discovered that there is a positive relationship between sales promotion and company's sales volume expectations and that sales promotion increases the demand for a company's products.

The managerial implications of this study are discussed in the following paragraphs.

- Business organisations should not see sales promotion as a waste of money but rather see it as a means to an end and not the end itself.
- Business organisations conducting sales promotion should ensure that, only competent advertising agency are involved in the sales promotion activities; that is the right hand should handle the promotion.
- Sales promotion should be carried out on a regular basis, and it should be centralised all over the country.
- The type of incentives use and the promotional tools employed go a long way in determining the success of sales promotion. Organisations should therefore always endeavour to use the best promotional tools available.

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- The marketing department of an organisation needs to work hand in hand with its sales team to achieve a better promotional result.
- Interest of consumers should be considered first when organising sales promotion. Promos should be targeted at a particular market after considering the consumers in the market, such as their lifestyle and purchasing power.

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An investigation of impact of Brand Extension on Parent Brand Image: A case study of Johnson, UK

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Abstract

Purpose of study: The main purpose of this study is to investigate the impact of brand extensions on parent brand image. For this purpose Johnson is selected as parent brand for current study. The selected brand extensions are Johnson shampoo, Johnson's isotonic drinks, Johnson's sportswear and Johnson's suntan lotion. **Research Methodology:** sample was selected from Bradford, UK. Sample consists of consumer of Johnson including males as well as female. Total sample size is 250 and data was collected through self administered questionnaires. Convenience sampling was selected as sampling technique. **Results:** Correlation analysis

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indicated negative impact of brand extension on parent brand image if brand extension is done in different brand categories. Perceived brand quality and perceived brand fit of the extension also affect the parent brand image.

Conclusion: It is concluded that if brand extension is done in the same product category of parent brand then there is possibly high acceptance for the brand extension rather than in the different product categories.

Key words: Brand Extension, Parent Brand, Brand Fit, Consumer Behavior, Johnson, UK

1. Introduction

Many companies adopt brand extension as strategy with the aim of benefiting from the brand knowledge achieved in the current markets. Marketing strategy determines the choice of target market segment, positioning, marketing mix, and allocation of resources (Aaker et. al., 1990; Milberg et al., 1997). When a company launches a new product and market under the umbrella of a well-known brand name, failure rates and marketing costs are reduced (Keller, 2003). Keller (2003) has stated, more than eighty per cent of firms, resort to brand extensions as a way of marketing goods and services.

Fierce competition forces firms to adopt strategies that create a competitive advantage for the firm. Creating a brand name with well-established association is one way of achieving this aim. Firms invest heavily in developing a brand. It is a very costly process but has many returns once success is achieved (Keller, 2008). However, firms do not always have the financial strength to create a new brand name for each newly developed product. Usually a more economical strategy is used to introduce a new product under the umbrella of already existing product. According to James (2006), companies need not to create a new brand name for new product category; companies should use the name of known, successful and well established brand instead of creating new product name, in other words, brand extension is used.

It is a well-known fact that developing a new brand requires much more investment than creating a brand extension which is what motivates firms to prefer brand extensions of already well established brand (Keller, 2008).

Market is a place of competition and cost associated with introduction of new brand always soars, many firms are trying to decrease the risks involved in new product introduction and market the new product using the name of already well known existing brand as brand extension (Amble, 1997).

Brand extensions leverage a firm's most valuable hidden asset, its brand name (Tauber, 1981, 1988). For this reason the last decade shows that many firms use brand extension strategies to enter new markets. According to Amble et al. (1997), it is a common strategy for the last decade that companies prefer brand extension rather than introducing a new product under new product name. Companies save their cost as well as minimize the risk by launching a new product as brand extension under the brand name of already well-known parent brand. Amble (1997) suggested that when a product is introduced under brand extension, it has more chances of survival than introducing a new product with new brand name. Marketers believe that brand extensions are evaluated favorably by consumers because consumers transfer positive attitudes or affect toward the parent brand to its extension. Yet, this transfer may not be automatic but may depend upon the perception which consumer had in his memory about parent brand and its extension (Aaker et al., 1990). For this study, the chosen parent brand is Johnson; while, Johnson's shampoo and selected similar brand extensions are suntan lotion and distant brand extensions are sportswear and isotonic drinks.

2. Literature Review

Companies in order to reduce the cost always plan and adopt new methods. The brand extension is also a new style for brand management which creates the value for single name and makes it a mega brand. Companies prefer to extend the brand rather than creating a new brand. Companies introduce new product or extend the product line to avoid the risk involve in introducing new brand. In brand life cycle (growth, expansion, scope and adaptability), brand extension always plays a very crucial part (Kapferer, 2001). Many companies use the image of existing brands in new markets and launch new products e.g. Virgin Group. Virgin is initially worked on retailing and publishing of popular music. By using the previous repute, the company launched its existing brands in new market. The firm started its business from music and now it owns air lines, well reputed financial advisor and cola

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producer (Randall, 2000).

According to Buday (1989), the companies rational behind extending brands are to attain economies of scale. Basically companies use the one brand name and introduce product in different categories, it can possibly reduce the communication expenditure as extended brand utilizes the well positioned parent brand name. The customer easily gains familiarity with new product due to the awareness and attachment with parent brand name. Most important consideration for launching a new product is to capture more market share and improve the net profit margin by using the name of well established brand. According to Pitta et al., (1995), observed that change in top management of companies is some time reason for brand extension. Change in management mean change in company vision because of updated knowledge of members which may contradict the past concept of single brand image. Establishment of R&D department in every organization initiated the process of market research which favors technological change and process improvement.

Ambler and Styles (1997) suggested that it is important for companies to have knowledge of brand, its mechanism, extension techniques and their implementation in market which make a brand successful and make its positioning easy. He suggested that the managerial process play a very significant role for successful brand extension.

Whenever a company initiates a new product it is considered as new product development. Launching new brand maximize the risk of failure so there is need to change the product development process and thus increasing the chances for all new initiated products to be successful in market (Brassington et al., 2000). Developing a brand extension is considered as development of new product. Brassington et al. (2000) suggested an eight stage new product development framework that describes the product development process. These eight steps for new product development includes: idea generation, idea screening, concept development and testing, business analysis, product development, test marketing, commercialization and monitoring and evaluation.

There are three studies which provide basis for customer brand evaluation. The first study was conducted by

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Aaker and Keller in 1990. They started with two research designs to evaluate the customer brand evaluation. According to results of their first study, customer associations with any specific brand can either harm or improve the evaluation about brand extensions. If parent brand is well recognized and well positioned, brand extension acceptability in market increases. Similarly, parent brand lays the basis for successful acceptance of its extensions (Aaker & Keller, 1990). The second study was conducted by Sundae and Brodie (1993); they adopted the same methodology and hypothesis tested by Aaker and Keller in 1990. Some of their results showed relevance with Aaker studies while others were different. According to their results the relationship between how difficult it is to make the product class of the extension and the attitude towards the extension was not significant. However, if the parent brand perceived quality is high then customer attitude towards acceptance product extension is higher. Their results also supported the Aaker and Keller conclusion that the fit between the parent brand's product class and the extension's product class has a positive association with the attitudes the consumers have towards the extension. Third study was conducted by Bottomley and Doyle in 1996; this is the second replication of Aakle and Keller study. The authors were interested to test of results of both studies which conducted on customer brand evaluation. According to their findings perceived quality and perceived fit of the parent brands are the two factors which make brand extension association in customer mind. The result of their study has not supported the Aaker and Keller notion, that it is an easy task to make extension; however, it is viewed as more favorable by the customer.

Volckner (2006, 2007 and 2008) work on image feedback effect on brand extension, consumer evaluation and drivers of brand extension provide baseline for new indicators for brand extension. Recent study of Volckner et al., (2010) results are in contract with previous studies. They concluded their results by using Partial least technique (PSL) that the dominant success driver is parent brand quality rather than the perceived fit between the parent brand and the extension. Similarly, Sattler et al., (2010) access the impact of brand extension success factors on brand extension price premium.

2.1 Problem Statement

Brand and branding strategy are widely researched topics; however, this study is an effort to investigate the impact of brand extension, in different product categories, upon parent brand. Earlier literature review (Aaker et al. (1990) fail to find any evidence that brand extension has an impact on the parent brand. However, it was found by many researchers that inconsistent brand extension (product not relevant with parent brand category) leads towards brand dilution. The main reason of brand extension failure is lack of new brand linkage in respect of its functions, similarity and familiarity with parent brand (Loken et al.; 1990 and Tauber, 1981).

Failure to meet customer expectations creates negative perception about parent brand which results weak brand association and disturb the original brand as well as new brands in different product categories. According to Martinez and De Chernatony (2004), brand image can be classified into two main categories i.e. general brand image also known as parent brand image and product brand image also known as extended brand. According to their model and results failure of extended brand image cannot affect the parent brand if parent brand is well established and strong enough like Nike and Sony. In such case, product image dilution is greater than that of brand image. However, this study is an effort to fill the gap by finding the impact of brand extension, in different product categories, upon the parent brand.

Following hypothesis were suggested based on comprehensive literature survey

H 1: Perceived brand fit for a brand extension in a different product category has an impact on parent brand image.

H 2: Perceived brand quality for a brand extension in a different product category has an impact on parent brand image.

H 3: Brand awareness for a brand extension in a different product category has an impact on parent brand image.

H 4: Consumer attitude for a brand extension in a different product category has an impact on parent brand image.

H5: Brand extension in a different product category has an impact on parent brand image

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3. Research Methodology

3.1 Sampling and Data collection

Primary Data is collected from consumers of Johnson in Bradford Area, UK who are familiar with the brand and they are also using brand extensions of Johnson. Self administrative Questionnaire is used. The data is collected from respondents for checking impact of similar as well as distant brand extension on parent brand. Variables under consideration will be brand image, consumer attitude, perceived quality, perceived fit and brand awareness. Secondary data was collected through two data bases i.e., Emerald and Science Direct. Population for current study is determined from literature survey. According to definition provided by Sekaran (2001), a group of elements, objects and events which are of research interest is called population. The sample size for this study is 250 consumers comprising male and female. Convenience sampling technique is to be used for drawing sample from the population of Bradford city UK. For data analysis, descriptive statistics as well as correlation is used. SPSS is used for analysis of data.

3.2 Measurement Development

A structured questionnaire was used for current research. In current research, the issue was factors of brand extension which may affect parent brand image. First these factors are conceptualized with operation for development of questionnaire. According to Joseph et al. (2007), "Questionnaire is formal document contain questions for respondent to record their answers and those responses were measured". The entire questionnaire is self-administered by the researchers.

3.3 Variables

According to Kim and Lavack (1996), brand extension can be categorized into two types. These are vertical and horizontal extension, that a firm can introduce, a totally new good in a product category or class, is called Horizontal extension. As well as, when an organization introduces a new extension in same product category but price and quality of product varies then it is called vertical extension. However, mostly the companies use the same brand name with horizontal extension while in vertical extension another brand name with core description

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of parent brand name is used. Literature survey highlights the point that Aaker and Keller (1990) were two authors who initiated the studies on consumer evaluation of brand. Similarly Mahony (2000) describe the point that there is very few authors who work in this area. They suggested that there is need for studies on customer brand evaluation at international level as its help countries to improve their strategic planning.

Literature review concluded the following variables which are considered as important factor while studying the impact between parent brand and its brand extensions in different product category. These includes: brand perceived fit, brand perceived quality, brand awareness and consumer attitude. The next step is to review literature about above mentioned variables and their relation with parent brand image.

3.3.1 Brand Perceived Quality (BPQ)

From consumer point of view, quality of extended brand is most significant when it is perceived about the brand. According to Aaker (1990), consumer evaluates brand according to his or her own perceptions about quality which is some time very difficult for companies to apprehend. According to results of a second study conducted by Aaker and Keller, satisfied consumers have strong attitude about the quality of the brand and this attitude remains same for extended brands also. These results were also justified by the study by James (2006). In simple words if consumer attachment with parent brand is higher, it will definitely increase the chances of brand extension to be acceptable by consumers. Similarly consumer acceptance for extension increases if consumer is satisfied with the perceived quality of parent brand. Therefore it is may apprehended from literature support that perceived quality of the parent brand possibly have positive impact on brand extensions.

3.3.2 Brand Awareness (BA)

Consumer brand recognition shows the awareness of brand. The well recognition of a brand is dependent upon the awareness of a brand. According to Keller (1993) definition of brand awareness

"The number of product related experiences that have been accumulated by the consumer (through product usage,

advertising, etc.)"

Literature supports the point that consumer interaction with or any kind of publicity of brand increase consumer awarness with brand (James, 2006; Keller, 2003). According to Aaker consumer prefer to purchase a brand with which he/she is familiar and had experience of that product. Aaker in 2004 conducted experimentation about consumer brand evaluation. Postgraduate students were the respondents of his study. During the experiment he showed participant some meaningless words and afterward in second experimentation he observed that most of the participants chooses those meaningless words which they showed them in first round. Thus he concluded that consumer experience or any sort of interaction keep customer intact with product. Consumer awareness about brand increases the chances of brand familiarity and as well as brand extensions. According to definition of brand familiarity by Broniarczyk et al. (1994),

"Knowledge of the brand-specific association is required for consumer's to appreciate the appropriateness of the brand in the extension category"

Thus it is concluded from above discussion that customer parent brand awareness increase the chances that consumer have positive image of its extended brands too. According to Alba et al. (1991), there are two mechanism of consumer knowledge. First is, brand awareness and second is brand related expertise. Consumer gains the brand awareness by experiencing and using the brand while consumer gain brand expertise ability by performing product related tasks. Therefore it is not important that consumer must have expertise to become aware to brand. The sufficient condition is consumer access to product for brand awareness. Marks et al. (1981) proposed that increased brand awareness improves the brand loyalty as customer knowledge towards brand. They concluded in their results that for brand awareness is high among those consumers who have strong brand association.

3.3.3 Perceived Brand Fit (PBF)

Brand fit means that how closely extended brand resembles with parent brand in terms of quality and features. Brand fit is not simply restricted to same product category but it is also related to other product classes. According

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to suggestion of Park et al. (1991), consumer evaluates brand extension fit by two different ways. First customer judge the brand extension similarities with parent brand while steadiness of brand concept is the second source. Customer can perceive brand fit by considering any of the brand similarity. According to Aaker (2004), brand fit can prevail in consumer's perception because of his/her association with brand. This association with brand may be because of following reasons i.e. product features, products functionality, product application and used technology. The strength of brand fit is highly dependent on consumer association and attachment with parent brand.

"A meaningful association that is common to both the brand and the extension can provide the basis of fit" (Aaker, 1990)

According to Han (1998), if there is low fit between parent brand and brand extension then that brand extension is perceived as of lower quality then the other brand extensions. Such case of lower fit can never be overcome by advertisement neither by improving product attributes. According to the results of previous conducted studies, strengthen brand fit between parent brand and extension in customer mind made customer to perceive brand extension more positively (Aaker and Keller, 1990; Park et al., 1991; Broniarczyk and Alba, 1994; Han, 1998; Martinez and de Chernatony, 2004; James, 2006; Kim and Roedder John, 2008).

3.3.4 Consumer Attitude (CA)

Consumer overall judgment of the brand is called consumer attitude. Attitude of consumer about any brand can be judged by many ways. For example, how frequently consumer use the brand, how frequent consumer buy the product, his loyalty with brand etc. Brand failure occurs only when there is negative consumer attitude towards brand. This negative attitude leads consumer to avoid certain brand (Keller, 1993). Therefore consumer attitude is very important consideration to decide before launching brand extension is market. Keller (1993) concluded in his studies that improved consumer attitude towards extension has positive effect on product brand image and if consumer attitude is low, it leads towards brand ignorance. Keller suggested marketing to create a positive brand association for favorable outcomes and on later stage this brand association has positive impact on brand image

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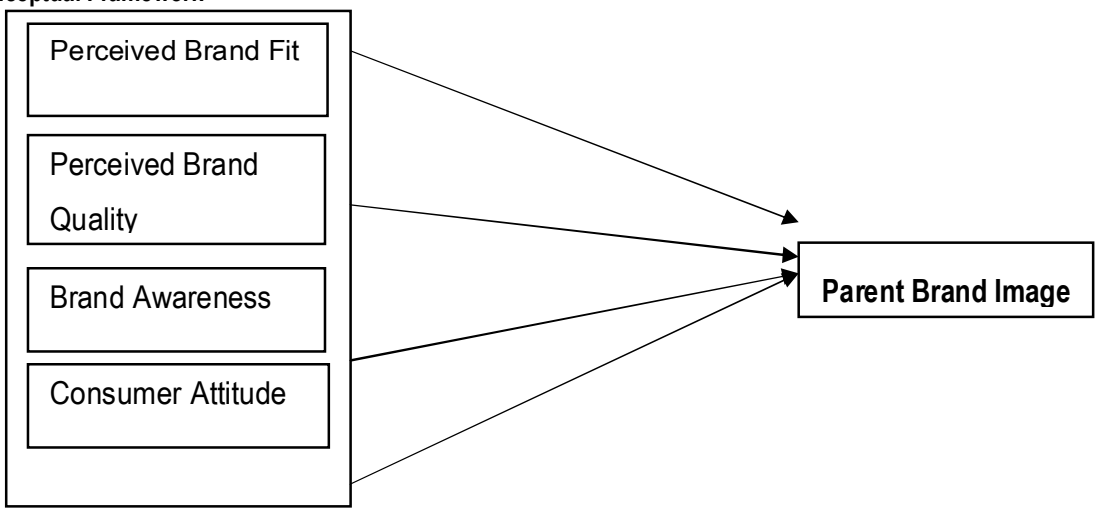
4. Conceptual Framework



Brand Extension

Figure-1 Conceptual framework for Parent Brand Image

5. Results and Analysis

5.1 Descriptive Statistics

Table-1 shows the demographic profile of respondents participated in survey. The population for this study consisted of Johnson & Johnson consumers. A total of 250 responses were collected by using convenience sampling. Female participants are more than that of males. As percentage of female participants in survey was about 164 and that of males were only 86Most of the respondent (27%) has an age range between 26 to 30 years. A total of 67.6% of the respondent's were aged below 30 years.

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Table-1 **Demographic Profile of Respondents**

Variables		Frequency	% age
Gender			
	Male	86	34.4
	Female	164	65.6
Total		250	
Age Group			
	15-20	57	22.8
	21-25	44	17.6
	26-30	68	27.2
	31-35	35	14.0
	35-40	29	11.6
	> 40	17	6.8
Brand usage experience			
	< 1 Year	39	15.6
	2-3 Years	87	34.8
	4-5 years	57	22.8
	6-9 years	47	18.8
	> 10 years	20	8.0

5.2 Reliability and Validity of Data

According to Leary (2004), Reliability is regularity and soundness of a tool used for measurement of data. Its shows how much reliable is the measurement which has been adopted to measure the collected data. Most of the researchers use the concept of validity for the measurement of quantitative data. Different tests were adopted to reinsure the results. Where as validity is degree to which adopted measurement tools helpful to measure the asked questions. Yin (1994) explained that validity is verification of research tool adopted for measurement. According to Yin (1994), there are three types of validity tests i.e. content validity, construct validity and criterion validity. Yin suggested that researcher can adopt any method suitable for his studies

Table-2 shows the Cronbach's α (alpha) of variables in consideration. Cronbach's α (alpha) is a coefficient of reliability. It is commonly used as a measure of the internal consistency or reliability of a psychometric test score for a sample of examinees. The results indicated Cronbach's α (alpha) for questionnaire (25 items) was 0.901. The Cronbach α (alpha) for individual variable of perceived fit is (0.875); perceived quality (0.812); brand awareness (0.792); consumer attitude (0.813) and parent brand image (0.864).

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Table-2 **Cronbach α (alpha) Coefficient**

Variables	Cronbach's α (alpha)	No of items
Perceived Brand Fit	0.875	5
Perceived Brand Quality	0.812	5
Brand Awareness	0.792	5
Consumer Attitude	0.813	5
Parent Brand Image	0.864	5
All Overall Alpha for instrument	0.901	25

5.3. Test for Normality of Data

As values of Cronbach Alpha for two of the variables is above acceptance level so in order to test collinearity, collinearity test was undertaken. Results are at Table 3.The results reflected that Tolerance levels (< or equal to 0.01) and Variation Inflation Factor (VIF) values (below 10) were within acceptable range (Kleinbaum et al., 1988). Durbin Watson values for all factors were between 1.5 and 2.5). The results did not indicate multicollinarity between variables.

Table-3 **Test of Collinearity**

Variables	Tolerance	Variance Inflation factor (VIF)
Perceived Brand Fit	0.651	1.537
Perceived Brand Quality	0.545	1.904
Brand Awareness	0.743	1.709
Consumer Attitude	0.702	1.364

Durban Watson Test value = 2.3

5.4 Correlation Analysis

There are four correlation matrixes according to different product category. Table-4 shows the correlation matrix about Johnson shampoo. Johnson's shampoo is pioneer brand of Johnson and Johnson's. According to table 3, results reveal that Johnson shampoo brand image has positive relation with brand awareness and value of r= .64 i.e. r-square is 64% (significant at 1%). Johnson shampoo brand fit is high and significant at 5%. Similarly, perceived brand quality is also high (r-square= 78%, P < 0.01) and has positive impact on brand image. Brand image of the product always enhances if company retain the perceived brand quality according to customer specification.

Value of perceived brand fit is also positive with brand familiarity i.e. r-square= 56%, P< 0.01. This high

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significance value shows that if the product is in same category then that product has high brand familiarity. All the value of consumer attitude is positive with perceived brand image, brand awareness, perceived brand quality and perceived brand fit and almost significant. It means that consumer brand awareness and brand usage is very high. Consumer brand awareness also has positive value with perceived brand quality i.e. r-square= 72% and significant at 1%.

Table-4 **Johnson's Correlation Matrix**

		1	2	3	4	5
1.	Brand Image	1				
2.	Brand Awareness	0.604**	1			
3.	Perceived brand fit	0.675	0.564**	1		
4.	Perceived Brand Quality	0.787	0.690**	0.725*	1	
5.	Consumer Attitude	0.656	0.343	0.235	0.305	1

**p< 0.01, *p< 0.05, N=250

Table 5 shows the correlation results for Johnson Suntan lotion. According to table 4.3, there is negative correlation between brand image and brand awareness. Value for r= -40 and relation is also significant at 1%. This means that there is low Johnson suntan lotion brand awareness which has negative impact on Johnson brand. Perceived brand fit has positive correlation with brand image and value for r-square is 67 % and significant at 5%. As Johnson suntan lotion is in same product category that's why brand image and perceived fit has positive relation. Similarly perceived quality is also positively associated with brand image.

Table-5 **Correlation results for Johnson Suntan Lotion**

		1	2	3	4	5
1.	Brand Image	1				
2.	Brand Awareness	-0.406**	1			
3.	Perceived brand fit	0.676	0.797**	1		
4.	Perceived Brand Quality	0.666	0.699**	0.601*	1	
5.	Consumer Attitude	-0.342	0.347	0.455	0.310	1

**p< 0.01, *p< 0.05, N=250

Table 6 shows the correlation results for Johnson's sportswear. It's the first product which is not in product category of Johnson. Johnson launches this brand extension in late 80's. According to results, there is negative correlation between brand awareness and brand image (r= 0.40, P< 0.01). As Johnson is mostly famous for its shampoo so due to low brand awareness, brand awareness is also low. Similarly there is also negative correlation between brand image and perceived fit (r= 0.788, P < 0.01). Low perceived brand fit is due to brand extension in

new category. There is also negative correlation between perceived brand fit and brand awareness (r= 0.345, P< 0.01). Literature review suggests that extending brand in new category has negative impact parent brand image as well as on brand awareness.

Table 6 **Correlation result for Johnson's Sportswear**

		1	2	3	4	5
1.	Brand Image	1				
2.	Brand Awareness	0.412**	1			
3.	Perceived brand fit	-0.788	-0.345**	1		
4.	Perceived Brand Quality	0.564	0.699**	0.422**	1	
5.	Consumer Attitude	-0.436	0.567	0.365	0.202	1

**p< 0.01, *p< 0.05, N=250

Table 7 shows the correlation results for Johnson isotonic drinks. Isotonic drinks were used to recover the lost energy after exercise. Johnson introduced isotonic drink for sportsmen. Table 7 shows that there is significant positive correlation between brand image and brand awareness (r= 0.70, P< 0.01). There is negative correlation between brand image and perceived brand fit (r= -0.76, P< 0.05). Negative relation is due to change in product category. Similarly perceived brand fit has negative correlation with brand awareness (r= -0.74, P< 0.01). Low brand awareness results when there is low brand familiarity. Consumer is well aware about Johnson shampoo and Suntan lotion but they don't have enough awareness about Johnson Isotonic drinks.

Table 7 **Correlation results for Johnson Isotonic Drink**

		1	2	3	4	5
1.	Brand Image	1				
2.	Brand Awareness	0.701**	1			
3.	Perceived brand fit	-0.768	-0.745	1		
4.	Perceived Brand Quality	-0.766	0.701**	0.600*	1	
5.	Consumer Attitude	0.400	0.295	-0.242	0.295	1

**p< 0.01, *p< 0.05, N=250

According to the results explained in above tables it is very clear that all these variables contribute significantly in branding. Almost all the results are according to literature review. According to results revealed, perceived brand fit is an important variable which has major impact on dilution of parent brand image. Launching a new brand extension in new product category is some time useful but consumer awareness and brand familiarity are major items to be considered before launch. As results are shown, Johnson Suntan Lotion has positive correlation results on brand image while there is negative perceived brand fit for both Johnson sportswear and Johnson

isotonic drinks. Although Johnson perceived brand quality is positive for all the brands but low brand fit diluting the parent brand image.

Table-8 **Regression Analysis Results**

Variables	Standard Beta (β)
Brand Image	0.406*
Brand awareness	0.647**
Perceived brand fit	**0.213**
Perceived brand quality	0.797**
Consumer Attitude	0.521**
Parent brand Image	0.369**
R^2	0.648
Adjust R^2	0.645
F Value	217.87**

**p< 0.01, *p< 0.05

Similarly, second most important observation is consumer attitude. Consumer attitude increases with brand awareness. In case of Suntan lotion which is Johnson product in parent brand category, consumer has positive attitude but for sportswear and isotonic drinks, it's negative. Overall results suggest that Johnson has to increase the awareness among consumer about their extended brands.

The F value (217.87, d.f. = 8,961) was significant at the 0.01 level and the total variance explained was 64.8% suggesting a good model fit. The variables ranked in order of their influence would be Perceived brand quality, brand awareness, Consumer attitude, brand image and parent brand image. The value for perceived brand quality is high then that of perceived brand fit. This result is in line with the findings of Volckner (2010). Similarly, most of the correlation results for perceived fit is also negative.

6. Discussion

Current study is a small effort to advance the information available on brand extension. First, study results shows that perceived brand fit or brand fit is the most crucial factor in order to evaluate brand extensions. As study results reveal that if the extended product is in same category of parent brand, then it receives high consumer recognition (Aaker et al., 1990). Suntan lotion is has high and significant value for perceived brand fit as its product category is

same as parent brand. While sportswear and isotonic drinks has negative perceived brand fit due to change of their product category. So it is concluded from above discussion that launching of brand extension in new product category dilute the image of parent brand.

Second important factor is parent brand awareness. If awareness of parent brand is high, then there is a high chance of success for brand extension. According to Aaker (1991) and Keller (1998), extension is helpful to improve profit margin but new product must in same category. They suggested that companies must build brand awareness as it helps and contribute a lot for successful brand extensions. In case of Johnson's, parent brand is very famous and popular among consumer but due to extensions in other product category, brand image may be affected. As consumer has different perceptions about different products so building positive brand association limit the risk of extension failure. So it is concluded from above discussion that parent brand awareness is crucial factor for success of brand extensions.

Thirdly, according to Volckner (2010), parent brand quality is most important driver for success of brand extension. Regression results in Table-8 suggest the same results. Previous studies claim that parent brand fit is important drive for success of brand extension but Volckner findings were different. Similarly, this study results also confirm the results of Volckner (2010).

Finally, according to Roselius (1971), if there is positive attitude from consumer towards parent brand then it will favor the newly launched brand extensions too. As in case of Johnson's, consumers have positive attitude in case of Suntan lotion but it's negative in case of sportswear. So it is also concluded from results revealed that positive perceived brand fit lead towards more consumer positive attitude for brand extension in different product category.

7. Implications of the findings

Results reveal that launching a product in same product category is more acceptable then that of new category. Introducing a new product in same category leads towards high perceived brand fit, high perceived brand quality and more consumer positive attitude. It is suggested that Johnson should adopt brand extension strategy but product must be in same category. Negative perceived brand fit and consumer attitude for sportswear and isotonic drinks shows that these brands are diluting Johnson's parent brand image so Johnson's has to adopt policy that should synergize the situation.

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Modeling and analysis of eBay.com's fee structure: a newsvendor approach

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Abstract This paper deals with a variety of revenue-sharing contracts in an e-commerce supply chain, say eBay.com. We develop analytic models with bearing the following questions in mind: what is the best solution for each fee structure? Which contract may generate the lowest price and, as a consequence, the highest channel profit? How do the parameters affect the price? To investigate these questions, we model the decision-making of the supply chain and carry our equilibrium analysis. Among the three strategies being studied, our analysis shows that the price-decreasing revenue sharing contract may generate the highest price and the lowest profit. It suggests that price-decreasing revenue sharing contract may be unworthy of adoption.

Keywords E-commerce · Consignment · Revenue-sharing · Newsvendor

1 Introduction

Over the past years, there are more and more manufacturers like to sell their products on website such as in eBay.com. EBay's business model relies on a large amount of third-party affiliated manufacturers who sell goods through its website. Manufacturers decide on how many units to list and the item's selling price. This paper deals with the decision-making of pricing and revenue sharing percentage such that eBay's and its manufacturer's revenue are maximized under the different revenue sharing contracts. eBay charges manufacturer according to the following policy, which is essentially a revenue sharing contract with consignment: eBay collects the handling fee only when the manufacturer's items sold.

Most of the literature of revenue-sharing focuses on discussing the channel with a retailer and a manufacturer. Wang et al. (2004) established a model as a Stackelberg game to describe the channel composed with a manufacturer and a retailer and find the best price and the revenue sharing of the channel. The retailer, acting as a leader, decides the percentage allocation of sales revenue. The manufacturer, acting as a follower, decides the produce quantity and the retail price of the product.

Consigned sale is a way that the manufacturer sells its product through the third party. Li et al. (2008) utilized the cooperative bargaining theory initiated by Nash, they proposed a cooperative game model to describe the payment bargaining process between the manufacturer and the retailer, and determined a new consignment contract with revenue sharing. Dana and Spire (2001) showed that revenue sharing is valuable in vertically separated industries in which demand is either stochastic (unpredictable) or variable (e.g., systematically declining), downstream inventory is chosen before demand is realized and downstream firms engage intra-brand competition. They also showed that revenue sharing is unlike a two-part tariff, it achieves the first best outcome by softening retail price competition without distorting retailers' inventory decisions.

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The newsvendor problem has a rich history that can be traced back to the economist Edgeworth (1888), who applied a variant to a bank cash-flow problem. However, this problem wasn't studied widely until the 1950s. Whitin (1955) was the first to formulate a newsvendor model with price effects. In his model, selling price and stocking quantity were set simultaneously. He adapted the newsvendor model to include a probability distribution of demand that depends on the unit selling price, where price was a decision variable rather than an external parameter. He established a sequential procedure for determining first the optimal stocking quantity as a function of price and then the corresponding optimal price. Petruzzi and Dada (2004) examined an extension of the newsvendor problem in which stocking quantity and selling price were set simultaneously. They modeled the randomness in demand using an addictive and a multiple functions; while ours is under a newsvendor framework using a multiple demand function.

The rest of the paper is organized as follows. Section 2 summarizes the notation and assumptions, and section 3 presents the models for three different strategies of revenue sharing contracts. Numerical study is given in section 4. Section 5 concludes the research and provides future research direction.

2 Notation and assumption

We consider a two-echelon supply chain with one supplier (manufacturer) and one retailer (eBay) under different consignment contracts with revenue sharing. Assume that the unsold units bear no salvage value or disposal cost. The products face multiple price-dependent demand function with uncertainty. Before presenting the models, we summarize necessary notation that will be used throughout the paper (see Table 1 for detail).

Table 1: The list of notation

P_1	selling price when the revenue sharing percentage is fixed
P_2	selling price when the revenue sharing percentage decreases in price
$D(P_1)$	order quantity when the revenue sharing percentage is fixed
$D(P_2)$	order quantity when the revenue sharing percentage decreases in price
c_v	unit handling cost of the supplier
c_e	unit product cost of eBay
f_s	closing fee
f_i	current fee
φ_1	decision variable set by the retailer when the revenue sharing ratio is fixed
φ_2	decision variable set by the retailer when the revenue sharing ratio decreases in price
b	price elasticity of demand function
$\pi_{v,1}$	the profit of the supplier when the revenue sharing percentage is fixed
$\pi_{v,2}$	the profit of the supplier when the revenue sharing percentage decreases in price
$\pi_{e,1}$	the profit of eBay when the revenue sharing percentage is fixed
$\pi_{e,2}$	the profit of eBay when the revenue sharing percentage decreases in price
Π_1	the total channel profit when the revenue sharing percentage is fixed
Π_2	the total channel profit when the revenue sharing percentage decreases in price

Based on the assumptions and the notation defined above, the linear demand functions can be represented as the multiple forms (see Petruzzi and Data 1999 for details) :

$$D(P_1)=y(P_1)\varepsilon_1 \text{ and } D(P_2)=y(P_2)\varepsilon_2 \tag{1}$$

where

$$y(P_1)=a\,P_1^{-b},\ y(P_2)=a\,P_2^{-b} \quad \text{and} \quad y(P_3)=a\,P_3^{-b}. \tag{2}$$

3 The model

We first develop the profit model for the manufacturer and eBay in the situation when the revenue sharing percentage is fixed. For comparison purpose, we also model the two parties in the situation when the revenue sharing percentage is increasing in the retail price.

3.1 Strategy 1: consignment channel with fixed r-s ratio

Based on the demand model in (1), the profit generated from the manufacturer is:

$$\pi_{m,1} = \int_{0}^{x_1} c_1 p_1 y(p_1) x f(x)\,dx - h \int_{0}^{x_1} y(p_1)(x_1 - x) f(x)\,dx$$

$$+ \int_{x_1}^{\infty} d_1 y(p_1) y_1 f(x)\,dx - s \int_{x_1}^{\infty} y(p_1)[x - y_1] f(x)\,dx - r y(p_1) y_1 \tag{3}$$

$$- f - f_0$$

Take the variable transformation approach by Petruzzi and dada (1999) by letting

$$z_1 = \frac{x - y(p_1)}{y(p_1)}$$

Equation (3) becomes

$$\pi_{m,1} = y(p_1)\{c_1 p_1 [z_1 - \Lambda(z_1)] - h\Lambda(z_1) - s\Theta(z_1) - r y_1\} - f - f_0 \tag{4}$$

Define

$$\Lambda(z_1) = \int_{-1}^{z_1} (z_1 - x) f(x)\,dx$$

and

$$\Theta(z_1) = \int_{z_1}^{\infty} (x - z_1) f(x)\,dx$$

representing the expected overage and underage quantities, respectively. To maximize the expected profit function, we take the first partial derivatives of (4) with respect to p_1:

$$\frac{\partial \pi_{m,1}}{\partial p_1} = c_1 y(p_1)[z_1 - \Lambda(z_1)] + c_1 p_1 y'(p_1)[z_1 - \Lambda(z_1)] - c_1 p_1 y(p_1)\Lambda'(z_1) - s\Theta(z_1) - h\Lambda'(z_1) \tag{5}$$

Letting (5) equals zero yields

$$p_1^* = \frac{b[c_1 w_1 + s\Theta(z_1) + h\Lambda(z_1)]}{(b-1)[z_1 - \Lambda(z_1)] c_1} \tag{6}$$

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Substituting equation (6) into (4) and taking the first partial derivatives of it with respect to z_1 to maximize the expected profit function of manufacturer yields

$$\frac{\partial \pi_{m,1}}{\partial z_1} = \frac{\alpha}{b+1}\left[\frac{(b+1)\varepsilon_1}{c}\left(\frac{\alpha - \Phi(z_1)}{\alpha z_1 - \varepsilon\Phi(z_1) + h\Phi(z_1)}\right)^{b}\left(\frac{1}{1-b}\right)[\alpha z_1 + h\Phi(z_1) - 1]\right.$$
$$\left. + h\Phi(z_1) - h\frac{\phi(z_1)[1-\Phi(z_1)]\Phi(z_1)}{\phi(z_1)}\right\} \tag{7}$$

Letting (7) equal to zero yields

$$z_1^* = F^{-1}\left(\frac{\alpha - \Phi(z_1)}{\alpha z_1 - \varepsilon\Phi(z_1) + h\Phi(z_1)}\right) \tag{8}$$

Likewise, the profit generated by eBay is:

$$\pi_{e,1} = \int_{z_1}^{\infty}(1-\Phi_1)\varepsilon_1 y(p_1)x f(x)dx + \int_{z_1}^{\infty}(1-\Phi_1)\varepsilon_1 y(p_1)z_1 f(x)dx - \varepsilon_1 y(p_1)z_1 + f_s \tag{9}$$

Let

$$z_1 = \frac{\Phi_1}{y(p_1)}, \qquad \Lambda(z_1) = \int_{z_1}^{\infty}(x - z_1)f(x)dx \qquad \text{and } D(P_1) = y(P_1)\varepsilon_1 \tag{10}$$

The expected profit function becomes,

$$\pi_{e,1} = y(p_1)\{(1-\Phi_1)p_1 z_1 - \Lambda(z_1)\} - \Phi_1 z_1 + f_s \tag{11}$$

To solve eBay's problem, since p_1 and z_1 are determined in equations (6) and (8) respectively, we substitute them into (11) and take the first partial derivatives of it with respect to Φ_1 ,

$$\frac{\partial \pi_{e,1}}{\partial \Phi_1} = \varepsilon_1 b^{b}\left(\frac{1}{1-b}\right)[\alpha z_1 + h\Phi(z_1) + h\Phi(z_1)]^{b}$$
$$[\alpha z_1 + h\Phi(z_1) - h\Phi(z_1)][1 - \Phi(z_1)]\Phi(z_1)[b-1]^{b} \tag{12}$$

Letting (12) equal to zero yields

$$\Phi_1^* = \frac{(b+1)[\alpha z_1 - h\Phi(z_1) + h\Phi(z_1)]}{b[\alpha z_1 - \varepsilon\Phi(z_1) + h\Phi(z_1)] + (b-1)\alpha z_1} \tag{13}$$

Solving equations (6) and (13) jointly yields

$$p_1 = \frac{\lambda_1 b_1 [r(p_1) + s\Phi(p_1) + r\Phi'(p_1)] - (b-1)(r-s)}{(b-1)^2 [r - s\Phi(p_1)]} \tag{14}$$

And the expected profit of the manufacturer is

$$\pi_{v,1} = \frac{a(b-1)^{\lambda_1 - 1} [r - s\Phi(p_1)]^{\lambda_1} \{r\Phi(p_1) + s\Phi'(p_1)\}}{\lambda_1^{\lambda_1} \{\lambda_1 [r\Phi(p_1) + s\Phi'(p_1)] + (b-1)(r-s)\}^{\lambda_1}} - (f_1 + f_s) \tag{15}$$

Similarity, the expected profit of eBay is

$$\pi_{e,1} = \frac{a(b-1)^{\lambda_1 - 1} [r - s\Phi(p_1)]^{\lambda_1}}{\lambda_1^{\lambda_1} \{\lambda_1 [r\Phi(p_1) + s\Phi'(p_1)] + (b-1)(r-s)\}^{\lambda_1}} + f_s - f_e \tag{16}$$

3.2 Strategy 2: consignment channel with r-s ratio increasing in price

In this subsection, eBay's allocation percentage of the revenue sharing is increasing in price:

$$\phi = \phi_2 p_2^{-\beta} \tag{17}$$

Based on the demand model in (1), the profit generated from the manufacturer is:

$$\begin{aligned} \pi_{v,2} = & \int_{p_2}^{p_3} (1-\phi_2 p_2^{-\beta}) y(p_2) r f(x) dx - \lambda_2 \int_{p_2}^{p_3} y(p_2)(r-s)\Phi(x) dx \\ & + \int_{p_3}^{\infty} \phi_2 p_2^{-\beta} y(p_2) r f(x) dx - \lambda_2 \int_{p_3}^{\infty} y(p_2)(r-s)\Phi(x) dx \\ & - c_v y(p_2) x_0 - f_v \end{aligned} \tag{18}$$

Take the transformation approach by Petruzzi and dada (1999) by letting

$$x_0 = \frac{r\Phi(p_2)}{y(p_2)}$$

Equation (18) becomes

$$\pi_{v,2} = y(p_2)\{\phi_2 p_2^{-\beta} [r - s\Phi(x_0)] \Phi(x_0) - s\Phi'(x_0)\} - c_v x_0 - f_v - f_s \tag{19}$$

Define

$$\Phi(x_0) = \int_{-\infty}^{x_0} (x_0 - x) f(x) dx$$

and

$$\Lambda(z_2) = \int_{z_2}^{\infty} (x - z_2) f(x)\,dx$$

representing the expected overage and underage quantities, respectively. To maximize the expected profit function, we take the first partial derivatives of (19) with respect to p_2:

$$\frac{\partial \pi_{e,2}}{\partial p_2} = ap_2^{-b-\beta}(1-\beta)[z_2-\Lambda(z_2)] - abp^{-b-1}[p_2^{1-\beta}[z_2-\Lambda(z_2)] - c_v z_2 - s[D(p_2)-h\Lambda(z_2)]] \tag{20}$$

Letting (20) equal to zero yields

$$p_2^* = \frac{[illegible]}{[illegible]} \tag{21}$$

Substituting equation (21) into (19) and take the first partial derivatives of it with respect to z_2 to maximize the expected profit function:

$$\frac{d\pi_{e,2}}{dz_2} = \frac{[illegible]}{a+\beta-1} \cdot \frac{[illegible]}{[illegible]} \left[\frac{[illegible]}{(b+\beta-1)a_2}\right]^{\frac{-b}{1-\beta}} \tag{22}$$

$$[illegible]$$

Letting (22) equal to zero yields

$$z_2^* = F^{-1}\left(\frac{[illegible]}{[illegible]}\right) \tag{23}$$

Likewise, the profit generated from eBay is:

$$\pi_{e,2} = \int_{z_2}^{\infty} [1 - a_2 p_2^{-\beta}] p_2 v(p_2) f(x)\,dx + \int_{z_2}^{\infty} (1 - a_2 p_2^{-\beta}) p_2 v(p_2) z_2 f(x)\,dx$$

$$[illegible] \tag{24}$$

Let

$$z_2 = \frac{[illegible]}{y(p_2)}, \qquad \Lambda(z_2) = \int_{z_2}^{\infty} (x - z_2) f(x)\,dx \qquad \text{and } D(P_2) = y(P_2)\varepsilon_2 \tag{25}$$

The expected profit function becomes,

$$\pi_{e,2} = y(p_2)[(1 - a_2 p_2^{-\beta}) p_2 z_2 - \Lambda(z_2)] - c_v z_2 + f - f_s \tag{26}$$

To solve eBay's problem, since p_2 and z_2 are determined in equation (21) and (23) respectively, we substitute them into (26)and take the first partial derivatives of it with respect to $[illegible]$,

$$\frac{\partial \Pi_{e,v}}{\partial z} = \frac{r}{1-\beta} \left(\frac{b\left[\alpha z + s\beta(z) + h\Phi(z)\right]}{\left[z - \Phi(z)\right]\left[b+\beta-1\right]} \right) \tag{27}$$

Letting (27) equal to zero yields

$$z^* = \frac{(b-1)^{1/b} \left[\alpha z + s\beta(z) + h\Phi(z)\right]^{1/b} \left[\alpha z + s\beta(z) + h\Phi(z)\right]^{1/b}}{b\left[\alpha z + s\beta(z) - h\Phi(z)\right] + (b+\beta-1)\left[\alpha z + s\beta(z)\right]} \tag{28}$$

Solving equation (21) and (28) jointly yields

$$p^* = \frac{b^{1/b}\left[\alpha z + s\beta(z) + h\Phi(z)\right]^{1/b}}{(b-1)^{1/b}\left[z - \Phi(z)\right]} \tag{29}$$

And the expected profit of the manufacturer is

$$\pi_{e,v} = \frac{r(1-\beta)(b-1)^{\beta/b}(b+\beta-1)^{(b-1)/b}\left[z - \Phi(z)\right]^{b}\left[\alpha z + s\beta(z) - h\Phi(z)\right]}{b^{b}\left[b\left[\alpha z + s\beta(z)\right] + h\Phi(z)\right] + (b+\beta-1)\left[\alpha z + s\beta(z)\right]^{b}} - (f_l + f_s) \tag{30}$$

Similarity, the expected profit of eBay is

$$\pi_{e,v} = \frac{r(b-1)^{b-1}(b+\beta-1)^{(b-1)/b}\left[z - \Phi(z)\right]^{b}}{b^{b}\left[\alpha z + s\beta(z)\right] + h\Phi(z)\left[\alpha z + s\beta(z)\right] + (b-\beta-1)\left[\alpha z + s\beta(z)\right]^{b}} + f_l + f_s \tag{31}$$

4 Numerical study

In this section we report on a numerical study conducted to quantify our analytic findings, and more importantly, to attend managerial insights into the decision of the two strategy. The parameter settings are as follows: a=200, b=3 and β=0.5. Other parameter settings are h=0.25, s=0.75, α=0.1, c=1, f_l=0 and f_s=0.

The numerical result generated by the model is presented in Table 2.It reports the profit generated by different strategy with different b when the revenue sharing ratio is fixed. It clearly shows that when b<2, the profit generated by eBay is better than that generated by the manufacturer. However, when b>2, the profit generated by manufacturer is better than that generated by eBay. In addition, the price and the order quantity are decreasing in b.

Table 2: Numerical results for the price elasticity decision

b	z	P	q	r	π_e	π_v	Π
2.0	3,340	362	2,535	0.52	306,434	148,146	454,580
2.2	3,137	296	1,139	0.47	105,543	94,334	161,041
2.4	2,960	253	501	0.44	37,356	108,546	58,311
2.6	2,803	223	218	0.41	13,506	55,497	21,482
2.8	2,664	201	94	0.38	4,967	20,954	8,026
3.0	2,541	184	40	0.36	1,853	7,976	3,034
3.2	2,430	171	17	0.34	699	3,059	1,158
3.4	2,330	160	7	0.33	266	1,181	446

5 Conclusion

This paper deals with a research of setting the price to maximize the profit of the manufacturer selling his products on eBay. As we have shown that the manufacturer can gain higher profit than eBay does. If it combined with lower price elasticity, the manufacturer can gain more profit.

Our research contributes to the literature by considering the channel with a manufacturer and a seller. However, eBay has to face lots of competitors so the demand is more complicate. Future direction may be aimed at considering more general demand functions, multiple retailers and/or multiple manufacturers with competition, and information asymmetry.

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Consider an EPQ Model with process quality control

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Abstract:

Over the past decade there has been a great deal of researchers dedicated to the study of quality and the economics of production. In this paper, we develop a dynamic model which based on the hypothesis of a traditional economic production quantity (EPQ) model. This study shows that there is an optimal value of quality investment to make the production system reach a reasonable quality level and minimize the production cost. Based on our model, the management can adjust its investment in quality improvement to generate considerable financial return.

Keywords: Taguchi cost function; EPQ Model

Introduction

Product quality is a major concern in today's modern production systems. Poor quality products decrease customer satisfaction, reduce operating production overall efficiency and increase the cost of business operation. Accordingly, there have been a vast number of studies dedicated to the relationship between quality and economics of production over the past decade. Porteus (1986) was one of the earliest researchers to provide a mathematical model to characterize optimal simultaneous investment in setup cost reduction and quality improvement. Rosenblatt and Lee (1986) formulated and analyzed a similar model that considers investment in process improvements. In a subsequent paper, Lee and Rosenblatt (1987) considered the use of process inspection during the production run so that a shift to out-of-control state can be detected and restoration made earlier. Tapiero (1987) linked optimal quality inspection policies to the resulting improvements in manufacturing costs. Fine (1988) used a stochastic dynamic programming model to characterize optimal inspection policies, and added the quality-based learning effects into the model. Fine and Porteus (1989) refined Porteus' original work to allow smaller investments over time with potential process improvement of random magnitude. Chand (1989) validated Porteus' model when learning effect is present in setups and process quality. In a series of papers, Cheng (1989, 1991) included the production process reliability into a classic economic order quantity model. Hong et al. (1993) established the relationship between process

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quality and investment. Ng and Hui (1996) developed a cost model to determine the optimal number of learning actions to be taken and the optimal action limit. The model offers insight into the tradeoff of cost of quality and the cost of prevention. Banker et al. (1998) developed formal models of oligopolistic competition to investigate whether equilibrium level of quality increases as competition intensifies. Krishnan et al. (2000) examined the relationship between life-cycle productivity and conformance quality in software products. Salameh and Jaber (2000) considered a special production/inventory situation where items, received or produced, are of imperfect quality. Ganeshan et al. (2001) brought Taguchi's cost of poor quality into the economic production quantity model, and linked lot-size determination to the loss-based quality accounting system. Jaber and Bonney (2003) investigated the effects that learning and forgetting in set-ups and product quality have on the economic lot-sizing problem. Jaber and Guiffrida (2004) considered a modification of Wright's learning curve with no discarded defects and constant defect rate. Tsou and Chen (2005) developed a dynamic model for a defective production system with Poka-Yoke. Wu and Xie (2008) analysed the replacement cost for nonrepairable services products from a manufacturer perspective. Uthayakumar and Parvathi (2009) investigated a continuous review inventory model to reduce lead time, yield variability and setup cost simultaneously through capital investments.

In this paper, there are three significant contributions to the production and quality research. First, we develop a dynamic model that can help make joint decisions on aspects of finance and quality, a task which is very difficult for the traditional production-quality model. In our model, we focus on the financial return of quality investment but not the lot-size optimization. Second, the Taguchi's cost of poor quality factor has been brought into our model. This extension makes it easier to evaluate the cost of poor quality in a dynamic production system. Third, a practical case in the automotive industry, which obeys the 6-sigma DMAIC methodology, is discussed to verify the proposed model.

In the next section, we introduce the model proposed in this paper. Then, a quality improvement case in automotive industry is used to verify this model. In this case, the 6-sigma DMAIC methodology will be used in the process of problem solving. Then, we analyze the production cost of the case, and the optimal value of quality investment with minimum production cost is found. The last section presents conclusions for this paper.

The Model

We assume a dynamic production line over Nth periods. The primary goal of this

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model is to search out the minimum cost of a production system. I is the money spent on improving product quality. The total cost, $TC(I)$, is the combination of the production cost, the holding cost, the setup cost, the poor quality cost and the cost of improving quality. This combination is based on the hypothesis of the traditional EPQ model. The total cost, $TC(I)$, can be written as:

$TC(I)$ = Production Cost + Holding cost + Setup cost + Poor Quality cost + Cost of quality investment

(1)

The notation of our model is summarized as below.

Notation

C_r : rejection cost / unit
d_i : demand in period i

D(I): quality distribution function; (normal distribution function)
G_{i-1} : inventory carried from period i to $i+1$
h : holding cost per unit per period
I : Investment on quality improvement during the Nth period planning horizon.

K: Taguchi loss parameter

L : loss of poor quality per unit product

LSL: lower specification limits
N : production period
P : production cost of unit product
Q_i : production lot size in period i
S : setup cost per period

U: distance of the target mean from the specification limits

USL: upper specification limits

$\mu(I)$: population mean of quality characteristic

μ_0 : initial value of population mean of quality characteristic

μ_t : target value of population mean of quality characteristic function.

$\sigma(I)$: population standard deviation of quality characteristic

σ_0^2 : initial level of the variance of the system

σ_L^2 : minimum level of the variance of the system

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X: value of the quality characteristic

Each term in our objective function is defined as below:

$$\text{Production Cost} = \sum_{i=1}^{N} Q_i \times P \tag{2}$$

The first term in our model is the production cost. The production cost during the Nth period can be written as the summation of the lot size multiplied by production cost of a unit product in every period.

$$\text{Holding cost} = \sum_{i=1}^{N} h[G_{i-1} + Q_i - d_i] \tag{3}$$

The second term in the equation is the holding cost. The holding cost on the production line is the summation of the holding cost of the inventory in the Nth period. In equation (3), G_{i-1} is the inventory carried from pervious period, Q_i is the production lot size in period i, and d_i is the demand. $[G_{i-1} + Q_i - d_i]$ is the inventory in period i and $h[G_{i-1} + Q_i - d_i]$ is the holding cost in period i. Hence, the total holding cost is equal to the summation of the holding cost from period 1 to N.

$$\text{Setup cost} = \sum_{i=1}^{N} \delta(Q_i) \times S \tag{4}$$

The third term in our objective function is the setup cost. Setup cost includes the cost to change the mold, the cost to prepare material, the cost to adjust machines, etc. In our model, the setup cost is equal to the summation of the setup cost in every period. In equation 4, $\delta(Q_i)$ is a function of lot size. $\delta(Q_i)$ is equal to zero when lot size is zero and $\delta(Q_i)$ is equal to one when lot size is large than zero.

$$\text{Poor Quality Cost} = \sum_{i=1}^{N} Q_i \times \int_{-\infty}^{\infty} \mathrm{L} * \mathrm{D(I)dX} \tag{5}$$

The fourth term is the cost of poor quality. This term is the summation of the product of lot size and Taguchi's poor quality cost (PQC) of unit product in every period.

In equation 5, D(I) is the quality distribution function of production, and we suppose the quality characteristic performs as a normal distributive function. Under

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this hypothesis, we can write the quality distributive function as:

$$D(I) = \frac{1}{\sigma(I)\sqrt{2\pi}} e^{-(X-\mu(I))^2/2\sigma(I)^2}$$

$\sigma(I)$ and $\mu(I)$ are defined as functions of quality investment, I. The value of $\sigma(I)$ has an initial value and a positive lower bound. The boundary is produced by the nature of the production system or the limiting of practice. It is noted as, σ_0, the initial level of the variance and, σ_L, the minimum level.

There is an initial mean of the population of quality characteristic, μ_0, and μ_t is the target value of quality characteristic. Both $\sigma(I)$ and $\mu(I)$ are functions of quality investment, I. The function of $\sigma(I)$ and $\mu(I)$ can be written as (Hong et al., 1993; Ganeshan et al., 2001):

$$\mu^2(I) = \mu_t^2 + (\mu_0^2 - \mu_t^2)e^{(-\phi I)}, \phi > 0$$

μ_0 is the initial value of population mean of quality characteristic, and μ_t is the target value of population mean of quality characteristic.

As μ_0 = 4.99, μ_t = 5 and ϕ = 0.01, the function, $\mu(I)$, can be drawn as figure 1.

[Insert figure 1 about here]

$$\sigma^2(I) = \sigma_L^2 + (\sigma_0^2 - \sigma_L^2)e^{(-bI)}, b > 0$$

σ_0^2 is the initial level of the variance of the system, and σ_L^2 is the minimum level of the variance of the system.

As σ_0 = 0.1, σ_L = 0.05 and b = 0.01, the function, $\sigma(I)$, can be drawn as figure 2.

[Insert figure 2 about here]

There are two categories of the cost of poor quality. One is direct cost and the other is indirect cost. The direct PQC encompasses two major types of expenditure: controllable PQC and resultant PQC. Controllable PQC includes prevention cost and appraisal cost. Resultant PQC includes internal error cost and external error cost. The other category, the indirect poor-quality cost, includes customer-incurred poor-quality cost, customer-dissatisfaction poor-quality cost and loss-of-reputation PQC

(Harrington, 1987).

In order to link the costs of poor quality and quality performance, Taguchi has provided a quadratic function to describe this relationship. Taguchi defines quality as, 'The quality of a product is the (minimum) loss imparted by the product to the society from the time product is shipped' (Bryne and Taguchi, 1986). Taguchi's function directly links to the internal error cost and external error cost in direct PQC and indirect PQC. In our model, L has been used to denote Taguchi's function.

In Taguchi's function as shown in figure 3, this cost reduces to zero when the output of the process exactly meets the target, and it increases quadratically as the process moves away from the target. If X is the value of the quality characteristic, Taguchi's PQC function, L, can be expressed as: (Taguchi and Wu, 1985)

$$L = \begin{cases} K(X-\mu_t)^2 & if \quad LSL \le X \le USL \\ C_r & if \quad X \le LSL, X \ge USL \end{cases}$$

$$K = C_r / U^2$$

$$U = (USL - \mu_t) = (\mu_t - LSL) \qquad (6)$$

[Insert figure 3 about here]

Where K is defined as C_r / U^2, C_r is the rejection cost of unit product and U is the distance of mean from the specification limits. It is assumed that the USL and LSL are equidistant from the mean i.e., $U = (USL - \mu_t) = (\mu_t - LSL)$. C_r includes the internal error cost and external error cost in direct PQC and indirect PQC to reject one unit of product.

Quality investment cost = I

(7)

The fifth term in the objective function is the cost of quality investment. We define the cost invested in improving the product quality to ensure that only customer-acceptable products and services are delivered to the customer as the cost of quality investment, I. It is believed that the total quality investment, I, will affect the population mean and standard deviation of product quality distribution in the

mathematical formula that we mentioned above.

Based on the definition above, we can develop the dynamic model of the cost of a defective production system. This is the objective function of our model.
Minimize

$$TC(I) = \sum_{i=1}^{N} Q_i \times P + \sum_{i=1}^{N} h[G_{i-1} + Q_i - d_i] + \sum_{i=1}^{N} \delta(Q_i) \times S + \sum_{i=1}^{N} Q_i \times \int_{-\infty}^{\infty} \mathrm{L} * \mathrm{D(I)dX} + I$$

Subject to

$I, \ P \geqq 0$

$G_0 = 0$

and

$$\delta(Q_i) = \begin{cases} 0 & if \quad Q_i = 0 \\ 1 & if \quad Q_i > 0 \end{cases}$$

(8)

Summary and Conclusion

In this paper, we develop a dynamic model based on the hypothesis of a traditional economic production quantity model. The Taguchi's cost of poor quality has been used to evaluate the cost of poor quality in the dynamic production system. According to our research, there is an optimal value of quality investment which causes the production system to reach a reasonable quality level and minimize the production cost. Based on our model, the management can adjust the investment on quality improvement to generate remarkable financial return. The model can be diversely applied in different kinds of quality improvement cases.

Further study in this field can focus on a quality investment model for a stochastic dynamic production system. Research also may include more financial factors or different quality evaluation models into the model.

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Museum Conservation Management: Monitoring Condition Changes in Handling Objects

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1. Background of the case study

Figure 1, The main gallery (image courtesy of GMZ, 2010)

Figure 2, The main gallery and volunteer Janet (image courtesy of GMZ, 2010)

The Grant Museum of Zoology and Comparative Anatomy (Hereinafter referred to as GMZ) continues to be used as a teaching collection just like when it was founded by Robert Grant in 1827. The GMZ is the only remaining university zoology museum in London with around 62,000 specimens (GMZ 2010a). The primary function of the GMZ is as an educational resource for UCL students, staff, the public and the wider academic community, including Primary & Secondary schools, HE/Further Education (Hereinafter referred to as FE) and adult learners. The Museum aims to encourage the public understanding of science through hands-on learning provisions, which had reached a total 30,958 visitors in 2009 (GMZ 2010b).GrantMuseum has five National Curriculum links to school teaching including: KS1, KS2, KS3, GCSE

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and post-16. Since 1990s when GMZ officially became a university museum, family and public events have gradually started, dependent upon funding and staff. Currently Secondary Schools and Higher Education are the key targets (N. McEnroe, *pers.comm*., 25th January 2010). The zoology collections have been used judiciously in teaching and there are currently four full-time staff running the services including: Curator, Manager, Learning & Access Manager and Conservator. Collections used for Object-Based Learning at GrantMuseum have proved to be very competitive in terms of catering for different learning needs due to its size, which enables this hands-on approach. However, no research has been conducted to monitor how increasing access effects handled objects' condition; neither has standardised condition check on daily handled objects due to limited staff and resource.

2. Methodology

2.1 A single case study research design

The research was based on an exploratory case study design which aimed at exploring how changes in condition of handled objects had been measured, and explaining why certain conservation approaches were adopted by the single case. Although testing hypothetical theory was not the purpose of this research, empirical findings of this research were critically examined for theory generalisation and causal link.This research focused on studying a contemporary university museum phenomenon and its context, hence case study design was considered appropriate in terms of providing an insight into the single case. The reason for choosing Grant Museum was that it not only had the most National Curriculum links amongst the collections, but also had the most used object- based activities in terms of visitor numbers. The

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research methods applied aimed at collecting multiple sources of evidence to increase the validity and reliability of the findings. The following are the research methods:

2.1.1 Standard open-ended Interview (18 January – 1 February 2010)

The interview question templateand the open-ended interviews were voice recorded with permission from the five interviewees:

Table 1

Interview Date	Interviewees participated in the standard open-ended interviews
18 January 2010	Andrew Richmond, Learning & Access Manager, GMZ
19 January 2010	Gillie Newman, Conservator, GMZ
25 January 2010	Natasha McEnroe, Manager, GMZ
26 January 2010	Mark Carnall, Curator, GMZ
1 February 2010	Jack Ashby, Head of Learning & Access, UCL M&C

2.1.2 Direct and participatory observation (26 January – 24 February 2010)

The use of direct and participatory observations as data collecting methods was considered relevant in terms of observing how handling objects were used in their natural settings, and how people interacted with objects and facilitators, explaining their contextual reality. Prior consent from school leaders and observation arrangements were sought through meetings with Learning & Access Manager (Hereinafter referred to as LAM), GMZ. Permission for photography was sought from school leaders, HE students and researchers

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before each observation started.The sampling method was convenient sampling.

2.2 Field experiment - Condition checks on handling objects (5 January – 25 March 2010)

Field experiments were designed to explore:

1) How reliable visual monitoring with basic tools was

2) If small details of change could be visually detected

3) If changes occurred on more frequently handled objects

4) What types of new changes occurred?

5) Was there a causal link between handing and damage?

6) What was the appropriate period over which to determine change?

2.2.1 Scope of the experiment:

The field experiment included one pilot condition check and a reliability test which was done before and during the four formal condition checks respectively. There were two sets of formal condition checks undertaken during their individual specified periods, one at the beginning and one at the end. This exploratory experiment aimed at measuring and documenting any new changes on handled objects' condition by using a standardised condition check template, which provided both quantitative and qualitative data. The indicator was 'new changes on object's physical condition', which was defined as 'any visually observable loss or structural change on objects' fabric.' The aim of this experiment was to find out if any new damage introduced by handling occurred on frequently handled objects. Handling activity logwas

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designed to track 'the total number of time a studied objects had been used in handing sessions individually' throughout the experiment period.

2.2.2 Standardisation

The operational measures strived to control any variables that could affect the results of visual assessment such as lighting, photography setting, etc.

2.2.3 Pilot condition check (5 January 2010)

The purpose of the pilot condition check was to 1) calibrate the author's visual assessment and tools, 2) test the practicality of condition checks on selected objects and 3) test the practicality of the standardised condition check template. After researching the current Grant Museum's Object Exit Formand Loan Condition Report, the standardised condition check template was designed. After the pilot check, the template was revised again with particular changes made in the condition category tables to reflect the varieties of objects' condition. The object list was provided by Learning & Access Manager, the selection criterion was their frequency of use by him in handling activities both inside and outside Grant Museum in that the intention of this experiment was to find out if new damage occurred on more frequently used objects.

2.2.4 Reliability test (1 March 2010)

The purpose of the reliability test was to examine how reliable and standardised the author's visual assessments were. Two objects from LAM's final object list were selected for this test: Elephant Tooth and Lobster Claw for their complexity and simplicity respectively. This test applied standardised procedures, template and tools. There were two condition checks done on

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each object within the same day, one in the morning and one in the afternoon. The rationale was that within the same day the condition check results on each object should be the same as objects were only moved and handled by the author.

2.2.5 Formal condition check (9 January – 25 March 2010)

There were two sets of formal condition checks, one was based on LAM's object list, and another one was based on the freelancer Sophie Bluman's popular object list- according to objects' frequency of use in outreach handling sessions. Selected objects included bone, shell, skull and soft tissue which were susceptible to natural wear & tear (e.g. loose sutures and wobbling teeth) and physical weakness (e.g. protruding parts and old repairs). The reason to carry out two sets of condition checks was c.55 handling objects were on loan to freelancer, and only returned for visual checks once a term (A. Richmond, *pers. comm*., 18th January 2010).These objects were regularly packed for transportation so it would be worthwhile to monitor the physical condition of selected popular objects, examining if they were more susceptible to change.

2.2.6 Survey- Handling activity log

Both the Leaning & Access Manager and freelancer agreed to keep on track of the total numbers of use of the studied objects from their own list throughout their individual research period. By recording each studied object's handling use, it provided quantitative data, complementing to the data gathered from the condition check template. The combination of these two methods was designed in the hope to yield evidentiary findings by comparing the frequency

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of their handling use and their physical change, examining the causal link between handling and damage.

Conclusions & Recommendations

Standardised visual assessment with basic measurement tools had its limitations and very time-consuming, if rates of deterioration were to be monitored, fine detailed measurements were necessary. However monitoring did not necessarily reduce degradation or prevent unforeseen damage. In particular, no standard condition descriptive glossary, covering all types of materials, had been developed (Sully 2009a). If our understanding of condition and damage is to be established, a shared vocabulary would be essential. If given more time, the author would like to conduct the field experiment on a bigger sampling size and over a longer period which might provide more validity and representativeness to the findings, further examine in the causal link between handling use and condition change, and probe into the causes of change. The results did show that handling caused changes in objects' condition though evidence on whether damages associated with handling, deterioration rate or transportation was not sufficient.

A consensus on handling issues was achieved through a shared decision-making approach (Sully 2009b) amongst Curator, Conservator and Learning & Access Manager at Grant Museum. The finding showed whether an object was suitable for handling or not was a subjective value judgement; hence developing a shared concept on condition and deterioration could potentially provide a judgement guideline for museum staff (Conservation's 'Catch 22' 2010). The constant dilemma was should we use all the specimens

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and kept them ‘semi alive’ or should we use a group of specimens until they were totally lost? If we did not have adequate staff to supervise handling, should we run fewer sessions? Balancing access, conservation and funding priorities was challenging which further supported Lithgow’s (2009) argument. In this case, handling and its associated damage was justified as long as objects were used for their purpose.

Overall people responded positively to object handling though findings suggested there could be an age and gender differences which was worth further investigation. Future research into un-facilitated handling’s impact on visitor experience and objects would be worthwhile. The interview results of 1) staff caused more damage than visitors and 2) damage happens more with younger children and more at outreach sessions could be future hypotheses for testing. Corresponding to Peters and Romanek’s (2008) analysis of access, providing object handling was considered as a gamble based on trust at GrantMuseum. There were different levels of trust involvement according to users’ age and experience though sometimes lecturers would treat objects carelessly. The findings showed that there was no clear time period over which change could occur. In particular, some changes could be subtle and internal, and were out of the capacity of visual monitoring. Deciding an acceptable deterioration rate was challenging as other variables which caused change in objects’ condition would need to be taken into concern too. Did greater damage on objects necessarily bring reduced social benefits? Through the author’s observations, people generally showed appreciation when given the chance to handle poor condition objects or replicas.

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