CHAPTER FOUR
RESEARCH RESULTS

This chapter presents the research results and findings of the study. First, it describes respondent characteristics and the method of analysis. Second, descriptive statistics for change processes and effectiveness variables are discussed. This is followed by the results most relevant to the evaluation of the research hypotheses, i.e. the correlations between change processes and change effectiveness. In addition, although not directly related to the main aims of this study, the effects of several respondent characteristics on the responses and linear association between the variables are also investigated.

4.1 RESPONDENT CHARACTERISTICS

The profile of respondents is presented in Table 4.1.

Table 4.1
Profile of Respondents

AGE	FREQUENCY	PERCENT
24 and below	9	4.7
25 - 34	100	51.8
35 - 44	52	26.9
45 - 54	32	16.6
Total	193	100.0

YEARS OF SERVICE	FREQUENCY	PERCENT
0 - 9	123	64.4
10 - 19	44	23.0
20 - 29	22	11.5
30 - 39	2	1.0
Total	191	100.0

GENDER	FREQUENCY	PERCENT
Male	106	54.9
Female	87	45.1
Total	193	100.0

POSITION IN ORGANIZATION	FREQUENCY	PERCENT
Managerial	90	46.6
Non-managerial	103	53.4
Total	193	100.0

LEVEL OF EDUCATION	FREQUENCY	PERCENT
Non-degree holders	39	20.3
Degree holders	153	79.7
Total	192	100.0

NATURE OF EMPLOYMENT CONTRACT	FREQUENCY	PERCENT
Permanent (full time)	190	98.4
Permanent (part-time)	1	.5
Contract (full time)	2	1.0
Total	193	100.0

- The total number of responses for each item differs due to missing responses
- The categories in the respondent profile above may differ from those in the original questionnaire due to re-coding of categories.

Of the 193 respondents, more than half (51.8 percent) were aged between 25 and 34 years. Only 4.7 per cent were 24 years of age and below. 26.9% of respondents were between 35 and 44 years old while 16.6 per cent were aged between 45 and 54 years.

The majority of respondents (64.4 per cent) were relatively new to their organizations with 0 – 9 years of service. 23 per cent of respondents have served their organizations for 10 – 19 years, while 11.5 per cent were long-serving employees with 20 – 29 years of service. Only 1 per cent of respondents have been with their organizations for more than 30 years.

Gender distribution was approximately even (54.9 per cent male and 45.1 per cent female). The distribution of 'position in organization' was also approximately even with 46.6 per cent managerial and 53.4 per cent non-managerial employees.

A large majority of respondents were degree holders (or higher) with 79.3 per cent of total respondents. Non-degree holders accounted for 20.3 per cent of respondents.

Most respondents (98.4 per cent) were permanent full-time employees. Permanent part-time and contract full-time employees accounted for a fraction of total respondents (0.5 per cent and 1.0 per cent respectively).

4.2 FORMATION OF ORGANIZATION-LEVEL VARIABLES AND EFFECTIVENESS COMPOSITE MEASURE

The statistical analyses relevant to the examination of the research hypotheses listed in Chapter One requires analyses at the organization level, i.e. with the organization as the unit of analysis. Thus, the data from the 193 returned questionnaires were initially coded into a data matrix with each respondent (or questionnaire) as a unit of analysis. From this, a data matrix with each organization as the unit of analysis was formed by aggregating the responses from each of the organizations on each of the items on the questionnaire. For questionnaire items with a rating scale response format (all items in Sections I, J, K, L, M, N, O), an organization's score on a particular item was calculated as the average rating given for that item by all the respondents from that organization.

Questionnaire items in Section H yield categorical responses and therefore, the formation of organizational variables by the calculation of mean scores would be inappropriate. For this section, organization level variables were generated by defining a new variable for each of the four response options. The score on each of these variables was calculated as the proportion of respondents within each organization that marked each of the four categories. Therefore, for Section H, four new organizational level variables were formed (H1, H2, H3 and H4) corresponding to each of the response categories 1 to 4 with an organization's score on (say) variable H1 being the proportion of respondents from that organization that chose option 1 for Section H.

The research hypotheses for this study relate to the relationships between an organization's scores on the relevant items in the change process scales and the organization's perceived effectiveness of change, as measured by the organization's scores on the final ten items in the questionnaire (Section O – Items 1-10). Inspections of the correlations

(across the 17 organizations) among these ten effectiveness items showed them to be relatively strong and positively associated, which suggested that these items may be validly combined to form a composite effectiveness score for each organization. This was confirmed by the high Cronbach Alpha reliability estimate of 0.98 for an effectiveness measure calculated as the average of an organization's scores on items O1 – O10 (Reliability Analysis for Effectiveness measure shown in Table 4.2 below). The Cronbach alpha reliability estimate was slightly reduced with the removal of any of the ten items from the composite measure indicating that all ten items were important in the scale. The final ten items were therefore averaged to form a composite effectiveness score for each organization, which is labeled *effectiveness*.

Table 4.2
Reliability of Composite Effectiveness scale

Item	The change resulted in:	Alpha If Item Deleted
Effectiveness 1	Improved products or services	.9857
Effectiveness 2	Measurably higher productivity	.9866
Effectiveness 3	Improved services to customers and clients	.9864
Effectiveness 4	Measured improvements in goal-oriented criteria, such as revenues, growth, customer satisfaction, or other such criteria	.9870
Effectiveness 5	Improved efficiency	.9873
Effectiveness 6	Greater ability to compete in the marketplace	.9873
Effectiveness 7	An overriding culture of quality and excellence	.9856
Effectiveness 8	A sense of awareness, belonging and feeling part of the team/organization	.9870
Effectiveness 9	A greater sense of cohesion and integration in the organization	.9870
Effectiveness 10	Greater long-term health of the organization	.9872

Alpha = 0.9880

4.3 DESCRIPTIVE STATISTICS FOR CHANGE PROCESSES AND EFFECTIVENESS VARIABLES

Appendix 2 gives the means and standard deviations for variables relating to the organizations' change management processes and effectiveness. It also shows the correlations of all variables (all items in each scale) with the composite effectiveness variable, *effectiveness*.

For most items, a higher mean score represents the respondents' perception that positive change management processes (as described earlier) have taken place. This does not apply for items L3, L6, L7 and L12, where lower mean scores represent positive change management processes. Items J3 and L4 are value neutral.

Observations can now be made about the organizations with reference to each of the sections in the questionnaire.

4.3.1 Change Background and Strategy (Items H1-H4)

Responses were roughly evenly distributed between fine-tuning, incremental adjustment and modular transformation (23 percent, 20 percent and 21 percent respectively). 28 percent of respondents selected corporate transformation. This reflects the rapid changes that have taken place in the business environment.

4.3.2 Vision (Items I1-I11)

For all items in the 'Vision' scale, all organizations were above the neutral scale midpoint of three, leading to the conclusion that senior management developed, justified and communicated a clear and consistent vision for change. Means for items I6 and I4 were relatively high (3.49 and 3.47) indicating that a clear rationale and advantages of the change was explained to employees and key internal groups.

4.3.3 Leadership and Management Practice (Items J1-J15)

With the exception of Items J4 and J14, all items were above the scale midpoint of three. Items J1, J2, J5, J6, J7 and J10 have relatively high means ranging from 3.18 to 3.37 showing that the CEO and senior management team generally drove the change efforts from the top. In addition, the mean for Item J3 of 3.13 indicates that change transitions in general were marked by power struggles at the top. Management also "walked-the-talk" in that they set examples and lead the change with every word and action as shown by the above scale midpoint means of Items J8 and J9 (3.03 and 3.09). Item J4 was below the scale midpoint (mean = 2.93) indicating that assistance was not necessarily rendered to those who had trouble adjusting to new ways.

All but one item regarding participation (J12 – J15) had means above the midpoint of three, indicating that participation was more often than not a characteristic of change in organizations.

4.3.4 Resources (Items K1-K4)

On the average, respondents in the sample of 17 organizations perceived that inadequate human and training resources were allocated for the change (Items K2 and K4). They perceived adequate financial resources and management time in support of the change (Items K1 and K3)

4.3.5 Motivation and Rewards (Items L1-L12)

The relatively low means for items L3 and L12 indicate a general absence of the use of penalties to drive the change efforts. Respondents did not report any general increase in monetary gains (mean of 2.39 for Item L4) as a result of the change process.

However, they did report that recognition in other forms was provided for those who supported the change (Item L11). It was apparent that respondents possessed intrinsic motivation of the change through personal satisfaction and challenge as indicated by the means above scale midpoint for items L1 and L2. In addition, the means above scale midpoint for Items L5 and L8 indicate motivation through identification with managers and team members.

There is a general lack of internalization of the change (Items L9 and L10) to the extent of developing some cynicism about the change process and outcomes (Item L7).

4.3.6 Structuring for Change (Items M1-M9)

Means for Items M1, M2 and M3 are well above the midpoint of three. This indicates that in general, structural arrangements appeared to have been made and managed at the upper levels of the organization whereby there was clearly a driver for the change, setting up a change management team or steering committee, task forces, pilot projects, etc.

However, means for Items M4, M7, M8 and M9 are below the midpoint of three and Item M6 just above the midpoint. This indicates that change management structures were, in general, poorly developed beyond upper levels of management.

4.3.7 Communication (Items N1-N12)

This section related to the extent to which various communications approaches were used (Items N1-N6) and the perceived effectiveness of these approaches (Items N7-N12). Both scales indicate that in general, various communication mediums were

used adequately and effectively (Items N1, N2, N3, N4, N7, N8, N9 and N10). There was also moderately high managerial support of the change (Items N6 and N12) but little recognition and reward for those who supported the change (Items N5 and N11).

4.3.8 Change Outcomes-Perceived Effectiveness of the Change (Items O1-O10)

All the items in this section were above the scale midpoint indicating a positive evaluation of the change process, with item O3 representing improved services having the highest mean of 3.53. Item O9 had a relatively lower mean of 3.11, which indicated a lower sense of cohesion and integration as a result of the change.

4.4 CORRELATIONS WITH EFFECTIVENESS AND EVALUATION OF HYPOTHESES

The results most relevant to the evaluation of the research hypotheses are the correlations between the change processes with *effectiveness* shown in *Appendix 2*.

4.4.1 Hypothesis 1

There is clear support for Hypothesis 1 relating to visions and supporting plans. The highest correlation with *effectiveness* are with the existence and extent to which there was a plan detailing the various steps of the change (Item I8, $r = 0.797$) and a clear picture of how the organization will look like in the future (Item I11, $r = 0.776$). High correlations are also associated with a clear indication of how the change would impact upon your job (Item I9, $r = 0.710$) and an explanation of the advantages to key internal groups (Item I4, $r = 0.709$).

All correlations were significant at the 0.01 level, except for items I1, I2 and I10 which were not significantly correlated with *effectiveness*. The results for the three items may indicate that given the fact that the magnitude of change was mostly small to medium scale, and not organization-wide (refer section 3.3.1), the limited number of themes and directions were not particularly applicable in this study (Items I1 and I2) and did not entail major changes in the organizations' core values and beliefs (Item I10).

4.4.2 Hypothesis 2

With the exception of Item J1, all items were correlated with *effectiveness* at the 0.01 and 0.05 levels. Item J1 was not significantly correlated possibly due to the fact that employees did not need top management to remind them that old ways were unsatisfactory.

The highest correlation with *effectiveness* was for Item J9 with $r = 0.886$. This clearly indicates that for change to be effective, it is critical for top management to "walk-the-talk" by leading the change with every word and action. This fact is further reinforced by the high correlation with Item J8 ($r = 0.803$), in the importance of leaders modeling appropriate behaviours.

The correlations with items J2, J5, J6 and J10 ($r = 0.722, 0.580, 0.779$ and 0.782 respectively) offer clear support for Hypothesis 1 relating to the importance of cohesive action in leading the change from the top and championing a common vision.

The second highest correlation was with item J11 ($r = 0.856$). The explanation may lie in the characteristics of most organizations where the power to implement changes successfully more often

than not lies with the employees. Since the critical mass can either 'make or break' the organizational change effort, effective support building must therefore involve the employees rather than those perceived to-be in positions of power. This is further supported by correlations with items relating to participation (items J12 – J15), to be explained in the next section. While this is true, it is also important to provide support to those who experience difficulties in adjusting to new ways (item J4, $r = 0.816$).

4.4.3 Hypothesis 3

There was strong support for this hypothesis, which was generated from the universal prescriptions regarding the importance of participative leadership. High correlations with effectiveness for items J12 – J15 indicates that participation of employees is highly desirable for change to be effective. Items J14 and J15 had very high correlations with *effectiveness* (r = 0.856 and 0.832 respectively).

4.4.4 Hypothesis 4

With the exception of item K2 ($r = 0.774$ at the 0.01 level), the other three items (K1, K2 and K4) were significant at the 0.05 level. This indicates that sufficient resources in terms of finances, human resources, training and management support are important to ensure effective change. This may apparently be so in the cases of moderate to large scale change such as modular and corporate transformation programmes where substantial resources (financial and human) are important to support the change and to help employees adjust to new ways of doing things (training and management support).

4.4.5 Hypothesis 5

The motivation and reward items can be broadly divided into three distinct categories. Firstly, those rewards that were intrinsic in nature to the individual respondents such as personal satisfaction, challenge and development of new skills and competencies, confidence, internalization and personal ownership of the change (items L1, L2, L7, L9 and L10). All correlations in this category were high at the 0.01 significance level except item L7 which was significant at the 0.05 level). The highest three correlations in the motivation and rewards scale were in this category, namely item L9 (staff internalization of the change process, $r = 0.931$); item L1 (personal satisfaction, $r = 0.880$) and item L10 (personal ownership, $r = 0.825$). Item L2 (challenge) had a correlation of 0.774. Item L7, which is essentially the opposite of internalizing the change had a negative correlation ($r = -0.511$).

The second category in the motivation and rewards scale related to those items that were extrinsic in nature to the individual such as money (item L4), team pressure (item L5), identification with managers who modeled appropriate behaviors (item L8) and visible recognition for actively supporting the change (item L11). Correlations with effectiveness were significant for items L4 ($r = 0.778$) and L8 ($r = 0.668$) at the 0.01 level and for items L5 and L11, correlations were significant at the 0.05 level ($r = 0.493$ and 0.594 respectively).

The third category related to negative or punitive rewards applied to overcome resistance to change (Items L3, L6 and L12). All three correlations were not statistically significant indicating that punitive

measures did not have an effect the effectiveness of change efforts.

The study results attest to the relative importance of intrinsic rewards (Spritzer, 1996). They also support Ulrich and Lake's (1991) proposition that there should be less emphasis on punitive practices and more on rewards that have the power to motivate and shape desirable behaviours in the organization. Therefore, the results revealed that there was strong support for both hypotheses 5 and 5a, in that a variety of rewards in the form of positive reinforcements are important for motivating change and punitive action would not be associated with positive change outcomes.

4.4.6 Hypothesis 6

Items M1-M9 outlined the structural arrangements that are associated with successful change efforts from the general literature on change management. Items M1 and M2 specifically relate to the hierarchical arrangements for managing the change effort. However, correlations with effectiveness for these two items were not significant suggesting that formal hierarchical arrangements were not necessary for successful change outcomes.

The most significant correlations were for items M9, M7, M6 and M8 ($r = 0.796$, 0.725, 0.673 and 0.629 respectively). These correlations which are significant at the 0.01 level, indicate that change structures that promote and enhance effective two-way communication are essential for effective change. This sort of change structure incorporates clear and flexible communication (item M9), effective networking among organizational members (item M7), effective feedback mechanisms (item M6) and a special

communication network distinct from the organizational hierarchy (item M8).

4.4.7 Hypothesis 7

The questionnaire items in section N examined the extent of use (Items N1-N6) and perceived effectiveness (Items N7-N12) of a variety of communication strategies in supporting and facilitating the change.

With respect to extent of use of communication strategies, items N2, N3 and N4 were not significant. The most highly significant items N6 ($r = 0.910$) related to managers visibly supporting the change through word and action and N5 ($r = 0.806$) related to recognition and reward to those who support the change. Item N1 (regular messages on the bulletin board and other public forums) was significant at the 0.05 level ($r = 0.558$).

With respect to the perceived effectiveness of use, all items were significantly correlated with *effectiveness*. The first three items had relatively low correlations (items N7, N8 and N9 with $r = 0.600$, 0.660 and 0.593 respectively). The highest three correlations were items N11, N12, and N10 ($r = 0.803$, 0.745 and 0.721 respectively), significant at the 0.01 level.

These results imply that employees generally were not taken in by words, symbols or the number of communication channels or frequency of communication, but rather the quality and effectiveness of the communication. The respondents seemed to require "proof" of commitment to and genuine belief of the change effort and face-to-face communication via meetings. Evidently, employees were of the view that recognition and reward to those

who support the change is important for its success (item N6 and N12 with $r = 0.910$ and 0.745 respectively).

4.4.8 Hypothesis 8

This hypothesis is related to the effective use of "multiple leverage points" in managing the change effort and integration of the universalistic principles associated with Hypotheses 1-7. It is important that these change processes be aligned with and supportive of one another to create a common objective and to result in a successful change outcome. These change processes would work together 'in harmony' rather than work selectively to produce effective change.

The results indicated strong support for these universalistic principles and propositions for managing the change process in order to produce a positive and effective outcome. It is evident from the results (Hypothesis 1-7) that all the change processes would need to be managed well for the change to be successful, as this would not be possible if each process worked in isolation.

4.5 CHANGE STRATEGY AND PERCEIVED EFFECTIVENESS

It is also of interest to examine the correlations with *effectiveness* for the variables relating to change strategy (items H1-H4).

Items H1-H4 formed a scale reflecting the magnitude or degree of change, with fine-tuning representing minimal change and corporate transformation representing radical and large-scale change. The results showed that there was no significant correlation between items in the change strategy scale and *effectiveness*. This clearly implies that the perceived effectiveness of change was not related to the degree of change.

This finding is not surprising since the magnitude or degree of change does not have a bearing on its outcome. This shows that large-scale and complex change could be handled well while small-scale change may be managed poorly (or vice versa).

4.6 EFFECTS OF RESPONDENT CHARACTERISTICS ON CHANGE PROCESSES AND EFFECTIVENESS

Although not directly related to the main aims of the study, the effects of a number of respondent characteristics were also investigated. Average responses for each of the variables were calculated for several groups of respondents with respect to:

(i)   Level in organization (2 groups)

(ii)   Years of service (4 groups)

(iii)   Age (5 groups)

For item (i) above, the **T-test** was used to compare the means of the *managerial* and *non-managerial* groups with respect to all variables in the study. It was then determined if there was indeed a difference between the two employee groups for the different items. In the T-test for equality of means, if the p-value is less than the alpha level of 0.05, this indicates that there is a significant difference between the means of the two independent groups (managerial and non-managerial). If the p-value is more than alpha = 0.05, there is no significant difference between the managerial and non-managerial groups with respect to items in the scales. In this test, it was also assumed that the variances of the two groups were equal (homoscedasticity). The unit of analysis was the individual as opposed to the organization as in the previous section as organization-level variables

were not necessary in this case. A summary of the results using the T-test is shown in *Appendix 3*.

Group differences in items (ii) and (iii) were tested for significance using the **Oneway Analysis of Variance (ANOVA)** test with an alpha of 0.05. The **F-Test** was also used to determine if there was more variability in the scores of each of the independent groups. The larger the ratio of variance between the groups, the greater the value of F and more likely will the results be statistically significant. The unit of analysis was this analysis is again the individual for the same reasons as those stated above. A summary of the results using the ANOVA procedure is shown in *Appendices 4* & *5*.

4.6.1 Level in Organization

There was no significant difference between managerial and non-managerial employees in the 'Vision' scale, except for item I1. From the means of the two groups, it was observed that managerial level employees felt stronger about the fact that there was a limited number of clear and consistent themes and directions for change (mean for managers = 3.53 compared to 3.21 for non-managers).

For items J2, J7 and J8 in the 'Leadership and Management Practice' scale, there was a significant difference between the two groups of employees. Managers felt that there was clearer evidence that the CEO and top management shared and championed a vision (item J2), created and communicated a sense of urgency (item J7) and that managers set examples by modeling appropriate behaviours (item J8). The means for item J8 was 3.30 for managers and 2.82 for non-managers. In the case of item J8, perhaps the higher mean for managers was due to some form of bias since this item was reflective of managers themselves.

In the 'Structure' scale, significant differences only emerged in item M1 relating to clear evidence of a particular person or persons driving the change. The mean for this item was 3.70 for managers and 3.43 for non-managers. There were no significant differences between managers and non-managers with respect to communication except for item N11 relating to recognition and reward for those who supported the change.

There were no significant differences between the two groups with respect to the items in the 'Resources', 'Motivation and Rewards' and 'Perceived Effectiveness of Change' scales.

4.6.2 Years of Service and Age

With respect to years of service and age of respondents, the respondents were re-grouped to ease data processing and analysis. The original groupings according to the questionnaire and re-groupings are as follows:

Table 4.3 Years of Service (original and new group)

Original Group	New grouping
0-4 years	0-9 years
5-9 years	10-19 years
10-14 years	20-29 years
15-19 years	30-39 years
20-24 years	-
25-29 years	-
30-34 years	-
35-39 years	-

Table 4.4 Age – years (original and new group)

Original Group	New grouping
24 and below	24 and below
25-29	25-34
30-34	35-44
35-39	45-54
40-44	55 and above
45-49	-
50-54	-
55 and above	-

There were no significant differences between the groups in terms of years of service in all but one of the items (item N11) in the questionnaire. Significant differences emerged between the groups in terms of years of service relating to the perceived effectiveness of communication by providing recognition and reward for those who support the change. The highest mean in this item was for the 0-9 years of service group (mean = 3.23) and the lowest being that of the 30-39 years of service group (mean = 2.50). This shows that those long-serving employees felt that employees generally have not been rewarded and recognized for supporting the change.

For a range of items, it was clear that the younger employees (in terms of age) were more optimistic about the processes of change compared to older employees (Note: There were no respondents in the '55 and above' group, thus means were only calculated for 4 groups). Significant differences emerged between groups for items relating to top management leading the change with every word and action, emphasizing the change from the top, adequacy of senior management support, the opportunity for new and exciting challenges, the existence of a network of transition managers who

regularly met with management, the degree of usage and perceived effectiveness of various communication approaches and effectiveness of change in terms of improved products or services (items J9, J10, K3, L2, M5, N1, N8, N11 and O1 respectively). For all these items, the means for younger employees were higher than that of older employees indicating that older employees were less optimistic about the change processes.

It was observed that though there were significant differences between the groups with respect to years of service and age, these differences were not highly significant.

4.7   MULTIPLE REGRESSION

Regression analysis was also used to determine the linear association between the dependent and independent variables. For this purpose, composite scores for each variable in the questionnaire (also indicated in the hypotheses) were formed by aggregating the responses from each respondent on all items in each variable.

The linear model is as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \varepsilon$$

The dependent variable (Y) is Perceived Effectiveness of Change, whereas the independent variables are Vision (X_1), Leadership (X_2), Participation (X_3), Resources (X_4), Positive Rewards (X_5), Punitive Measures (X_6), Structure (X_7) and Communication (X_8).

Regression analysis will determine if Perceived Effectiveness of Change is related to the independent variables above.

For the analysis, two regression approaches were used, i.e. All variables regression and Stepwise Regression.

4.7.1 All Variables Regression

The results of the regression are shown below:

Table 4.5 All variable regression – Model Summary

R	R Square	Adjusted R Square
0.807	0.651	0.633

R Square is the coefficient of multiple determination, which is the percentage of variation in the dependent variable Y that is explained by the regression model. Adjusted R Square means that the coefficient of determination has been adjusted to take into account the sample size and number of independent variables. Adjusted R Square = 0.633, which means that 63.3 per cent of the variation in the dependent variable is explained by the model after taking into account the sample size and number of independent variables.

Table 4.6 All variable regression - Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig
	B	Std Error	Beta		
1 (Constant)	-2.700	2.836		-.952	.342
Vision	.150	.082	.126	1.832	.069
Leadership	.188	.090	.169	2.101	.037
Participation	.269	.181	.110	1.486	.139
Resources	-.115	.181	-.044	-.636	.525
Positive rewards	.373	.105	.237	3.569	.000
Punitive measures	-.651	.251	-.126	-2.590	.010
Structure	.171	.099	.127	1.727	.086
Communications	.250	.070	.250	3.578	.000

Dependent variable: Perceived effectiveness

The estimates of the coefficients are as follows:

α = -2.700; β_1 = 0.150; β_2 = 0.188; β_3 = 0.269; β_4 = -0.115; β_5 = 0.373; β_6 = -0.651; β_7 = 0.171; β_8 = 0.250

Thus, the sample regression line is:

Y = -2.770 + 0.150X_1 + 0.188X_2 + 0.269X_3 −0.115X_4 + 0.373X_5 − 0.651X_6 + 0.171X_7 + 0.250X_8 + ε

Perceived effectiveness of change is positively correlated with vision, leadership, participation, positive rewards, structure and communications, while it is negatively correlated with resources and punitive measures.

The ANOVA table is used for testing the utility of the model. If all the variables are equal to zero, then none of the independent variables are linearly related to Y, and therefore the model is of no

use. If at least one of the variables is not equal to zero, then the model has some utility.

Table 4.7 All variable regression - ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	7557.915	8	944.739	37.938	.000
	Residual	4059.079	163	24.902		
	Total	11616.994	171			

The p-value of 0.000 means that it is highly significant and therefore it can be concluded that the model is of use. The large F value also indicates that a large portion of the variation in the dependent variable, Y (perceived effectiveness of the change) is explained by the model.

4.7.2 Stepwise Regression

In stepwise regression, the independent variables enter the regression equation one at a time. The independent variable that is most strongly related to the dependent variable in the model is added at step 1. In step 2, the next most strongly related variable from the remaining variables is included. This continues until only the variables that are not linearly related to the dependent variable remains out of the equation.

Table 4.8 Stepwise regression – Model summary

Model	R	R Square	Adjusted R Square
1	.676	.458	.454
2	.750	.563	.557
3	.777	.604	.597
4	.793	.629	.620
5	.799	.638	.627

Table 4.9 Stepwise regression - Coefficients					
	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std Error	Beta	t	Sig
1 (Constant)	7.066	2.255		3.133	.002
Leadership	.754	.063	.676	11.975	.000
2 (Constant)	.678	2.265		.299	.765
Leadership	.494	.070	.443	7.077	.000
Communication	.399	.063	.399	6.371	.000
3 (Constant)	-4.754	2.523		-1.884	.061
Leadership	.315	.079	.282	3.967	.000
Communication	.353	.061	.354	5.820	.000
Positive rewards	.439	.105	.279	4.176	.000
4 (Constant)	-.739	2.724		-.271	.787
Leadership	.331	.077	.297	4.291	.000
Communication	.341	.059	.341	5.772	.000
Positive rewards	.457	.102	.290	4.472	.000
Punitive measures	-.824	.245	-.160	-3.369	.001
5 (Constant)	-2.140	2.785		-.769	.443
Leadership	.259	.084	.232	3.076	.002
Communication	.307	.061	.308	5.057	.000
Positive rewards	.429	.102	.273	4.205	.000
Punitive measures	-.801	.243	-.155	-3.300	.001
Vision	.165	.081	.139	2.034	.044

Dependent variable: Perceived effectiveness

From the results, it was found that only five variables (leadership, communication, positive rewards, punitive measures and vision) were linearly related to the dependent variable, perceived effectiveness of change.

The linear equations in the 5 steps are as follows:

Step 1

$Y = 7.066 + 0.754X2$

Step 2

$Y = 0.678 + 0.494X2 + 0.399X8$

Step 3

$Y = -4.754 + 0.315X2 + 0.353X8 + 0.439X5$

Step 4

$Y = -.0.739 + 0.331X2 + 0.341X8 + 0.457X5 - 0.824X6$

Step 5

$Y = -2.140 + 0.259X2 + 0.307X8 + 0.429X5 - 0.801X6 + 0.165X1$

The Adjusted R Square for the 5 variables range from 0.454 to 0.627 indicating that quite a high percentage of the variation in Y (perceived effectiveness of the change) is explained by the independent variables.

Table 4.10 Stepwise regression - ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig
1	Regression	5315.686	1	5315.686	143.409	.000
	Residual	6301.308	170	37.067		
	Total	11616.994	171			
2	Regression	6536.026	2	3268.013	108.699	.000
	Residual	5080.968	169	30.065		
	Total	11616.994	171			
3	Regression	7013.856	3	2337.952	85.328	.000
	Residual	4603.138	168	27.400		
	Total	11616.994	171			
4	Regression	7306.842	4	1826.711	70.777	.000
	Residual	4310.152	167	25.809		
	Total	11616.994	171			
5	Regression	7411.605	5	1482.321	58.512	.000
	Residual	4205.389	166	25.334		
	Total	11616.994	171			

In addition, the p-values in the ANOVA table above for all 5 models were 0.000 (highly significant). This again proves that that the variables are indeed related to perceived effectiveness of the change.