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A Scientific Approach to Implementing Change

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Organizations have used rigorous methodologies to identify the improvements necessary for remaining viable and competitive in today's turbulent business environment. However, they have rarely used the same level of rigor in the implementation of the identified improvements. One organization benefited by using design of experiments to determine the best approach for implementing a difficult organization-wide change.

Change is a reality of life. This is particularly true in the world of business where globalization, advances in technology, and increased competition at home and abroad have created a hostile and turbulent environment for most organizations. Change has become a mantra – change (improve) or die. Motivations for change have been customer satisfaction, cost reduction, improved efficiency, improved quality, or, in extreme cases, survival. In the past two decades, change/improvement intiatives have been driven by a plethora of approaches: ISO 9000, business process engineering, re-engineering, lean thinking, TQM, six sigma, etc. These ideas are not new. They date back to Frederick Winslow Taylor's 1911 book, *The Principles of Scientific Management.*

Simultaneously in England, R. A. Fisher was developing scientific techniques for the design of experiments and statistical techniques for analyzing the data generated by those experiments. In the 1930s, W. A. Shewhart of Bell Laboratories focused this approach on the monitoring and assessment of day-to-day production and initiated what came to be known as the *quality movement.* In the decades to follow, the view of work evolved from being composed entirely of repetitive, isolated tasks to the view of work as a whole, a *process* that can be managed and tweaked. Contemporary organizations have become adept at defining processes and then using experimental approaches to identify *what* needs to be changed. Many, however, have hit a roadblock when it comes to the implementation of change, the *how* to change.

If change efforts are unsuccessful, it is more often due to the human element than to systems or technology failure. Hence, much of contemporary writing on implementing organizational change focuses on the human side of change initiatives. Organizations are faced

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with building commitment and overcoming resistance to change. Soft skills are needed to successfully deploy new policy. The popular press abounds with implementation advice from motivational tools to training such that developing an implementation strategy has become a guessing game. There is another way – applying the scientific method to implementation. Millions of dollars are invested in performance assessment and identifying areas for improvement. Does it make sense to leave the implementation of the improvement to chance?

Organizations use the powerful methodologies of process improvement and design of experiments to determine *what* needs to be changed. It is prudent to extend these methodologies to find the most effective *how* to change. Statistical tools used at this stage can identify the most effective implementation plan in an objective manner rather than based on opinion or the flavor-of-the-week motivational strategy.

The following is an anecdotal account of a designed experiment used to determine how to most effectively implement a change from a commission-based remuneration to a salary-based remuneration. It is based on an actual implementation test conducted with a large company with a presence in many states. Changes have been made to disguise the company involved and the actual results achieved.

Organizational research determined that in order for this organization to remain viable, the remuneration structure of the sales force needed to change. Many companies have had tremendous difficulty with making changes of this type because changes to remuneration evoke strong responses among employees. Because this change was a matter of organizational survival, leadership used a powerful, scientific tool, design of experiments, to assist in developing a strategy for the rollout of the new payment structure. The experimental design chosen for this study was a fractional factorial with replication.

The management team, along with process improvement experts, decided to test seven factors they thought would help minimize resistance to change and maximize buy-in. The factors are presented in Table 1. Each factor had two levels or options with each indicated by a plus or minus.

At the time of the study, the organization had 150 stores. Thirty-six were randomly chosen for the study in order to guarantee 32 for the actual test in the event that special causes (e.g., management shake-up, natural disaster, or major competitor opening nearby) predicated the removal of a store from the test.

The test began in the second quarter of the year as it is a less volatile quarter in the retail industry. For a store to be a test participant, it had to have been in existence for at least 18 months so that comparable (comp) sales would be available from the previous year.

The total number of combinations of the seven test factors was two to the power seven, or 128. A specific subset of 16 of these was chosen for the test according to a specific experimental design, a fractional factorial. Each store was randomly assigned to each of these 16 treatment combinations such that each treatment combination had two stores. Each store received either the plus or minus level for each of the seven factors. For example, Stores 4 and 21 were assigned to the first treatment combination and received Factors A+, B+, C+, D-, E+, F-, and G-. In other words, the test involved a personal visit from a top manager (factor A+), implementation in stages (factor B+), one-week lead time (C+), no celebration (D-), announcement emphasizing future health of the organization (E+), no one-on-one meeting between middle management and sales associates (F-), and no incentive for minimizing attrition (G-). Attrition and sales were the two primary performance measures in this test. The cumulative results were computed at the end of the quarter for each test store.

Table 1

Factors to Be Tested

Factors	Levels
A	Top management presentation of change + In person - Via video
B	Implementation of change + In stages - Simultaneously
C	Lead time after announcement for initiating change + One week - Three to four weeks
D	Context for making announcement + Meeting plus celebration - Meeting only
E	Focus of corporate announcement + Future health of company - Long-term benefit to employee
F	Involvement of middle management with each sales associate + One-on-one meeting - No meeting
G	Minimizing attrition + Incentive - No incentive

Note. In replicating such a study, it might be necessary to consider blocking factors such as region, whether rural or urban.

Computational Steps for Sales

1. For each store, comp sales were calculated by multiplying the ratio of second quarter sales this year to second quarter sales last year by 100.
2. For each factor, the average comp sales were computed for all stores with the positive level of the factor. The same was done for all stores with the negative level. To find the factor effect, the difference between the two averages was computed. For example, the sales effect of factor A = (average comp sales for stores at A+) – (average comp sales for stores at A-). The +3.2 in Table 2 means the average comp sales for stores with A+ is 3.2% higher than the comp sales for stores with A-.
3. Variation between stores gives a standard deviation from which to determine limits to judge whether a factor estimation is statistically different from zero or not.

Computational Steps for Attrition

1. For each store, an attrition rate was determined by multiplying the ratio of the number of employees who left during the quarter to the average number of sales associates during the second quarter by 100.
2. Same as above.
3. Same as above.

The effects of each of the seven factors on sales and attrition are presented in Table 2.

Table 2

Effects of Factors on Revenue and Attrition

Factor	Revenue effect	Significant?	Attrition effect	Significant?
A	+3.2	Yes	+4.2	No
B	- 0.5	No	- 5.6	Yes
C	- 3.8	Yes	+3.1	No
D	+1.3	No	- 2.7	No
E	- 2.1	No	+3.4	No
F	+1.8	No	- 4.6	Yes
G	-0.8	No	- 1.1	No

Factors A and C significantly affect sales. Stores can increase sales by having top management personally visit each store to explain/aid in the transition and by using a longer lead time between the announcement and the implementation of the change. For the remaining factors that are not significant (D, E, and G), there is more flexibility in the options.

Factors B and F significantly reduce attrition. Stores can minimize attrition by implementing the change in stages and by having middle management meet one-on-one with each member of the sales force. As is the case for sales, there is flexibility in choosing the level of the remaining factors.

As a result of the test, management decided to implement the change in remuneration using the levels of the factors as represented in Table 3. Organizations have used rigorous methodologies to identify improvements necessary to remain viable and competitive in today's turbulent business environment. However, they have rarely used the same level of rigor in the implementation of the identified improvements. Using the same level of rigor as an approach to

implementation is appropriate when successful implementation is uncertain, potential gain is high, and implementation is done at a large enough scale to warrant a test on a smaller scale. In this study, management saw the value in applying this rigor and can approach implementing this change with confidence.

Table 3

Factor Levels Used to Implement Change

Factor	Reason
A+ Personal visit from top management	Increased revenue
B+ Staged implementation	Minimized attrition
C- Longer lead time	Increased revenue
D+ Do the celebration	Did not significantly affect revenue or attrition but felt it helped morale
F+ Conduct one-on-one meetings	Minimized attrition

About the Authors

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