



Side Effects of Communication  
Intermediating Effect of  
Feedback Loop on NPS® Score



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It has long been established that there is a very strong correlation between Customer Satisfaction and Company Performance. It is also well established that Employee Satisfaction is an antecedent to Customer Satisfaction. Ample research also exists to demonstrate that influencing Employee Performance could lead to better Customer Satisfaction.

Net Promoter Score (NPS<sup>®</sup>) has been proven as an effective means of measurement and improvement of Service Quality, which demonstrates Customer Satisfaction and enhances loyalty. Enhanced loyalty is expected to assist higher growth in revenue, which depends on superior service quality and further helps to improve employee performance.

This study investigates the relationship between the scores given by customers on the NPS<sup>®</sup> surveys, the subsequent interventions by the Client team, and its impact on the subsequent NPS<sup>®</sup> scores over a period of time.

NPS<sup>®</sup> scores for the Client showed continuous improvements over the time for which the NPS<sup>®</sup> scoring was adopted. As a part of the process, feedback was sought to be captured for respondents giving low scores, with a possibility of corrective action being taken by the operations team of the Company. Subsequent measures of NPS<sup>®</sup> scores for such customers showed that these respondents improved the NPS<sup>®</sup> scores, clearly demonstrating that interventions through feedback surveys helped to increase the NPS<sup>®</sup> score for the organization as a whole.

1

## INTRODUCTION

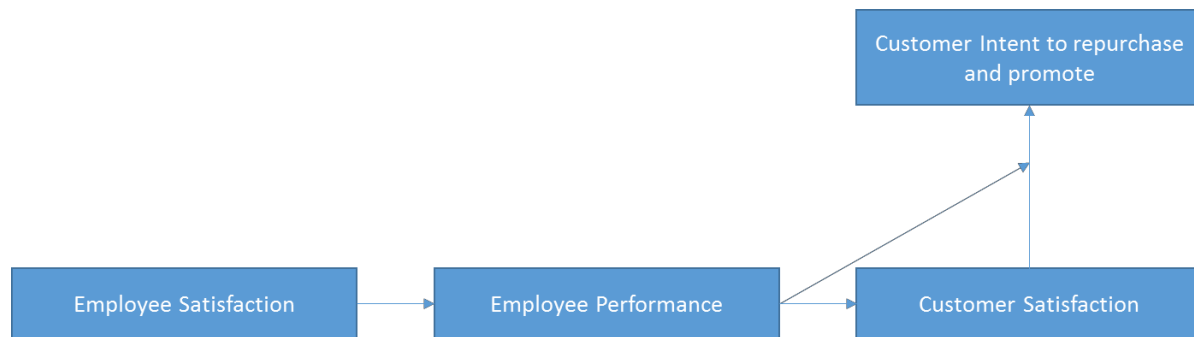
*"Here's the thing about the future. Every time you look at, it changes — because you looked at it— and that changes everything else."*

Cris Johnson, in the Movie "Next". In managing customer relationships, a question that begs to be answered is whether the mere act of communicating with the customer is likely to impact the relationship irrespective of the content or intent of the communication.

<sup>1</sup> This Paper is a summarized version of the Paper presented by Datawise at IIM Ahmedabad by K Vinay Kumar and Lalit Barhate.

It has long been established that there is a very strong correlation between Customer Satisfaction and Company Performance. It is also well established that Employee Satisfaction is an antecedent to Customer Satisfaction. Companies are now trying to link employee performance to customer satisfaction. Various means are available to seek customer feedback such as Customer satisfaction surveys, campaigns, mystery shopping, usability studies, etc. However, key managements seek simpler means to measure and monitor customer feedback.

**Figure 1 Established relationships between employee satisfaction, employee performance, customer satisfaction and customer's propensity to repurchase**

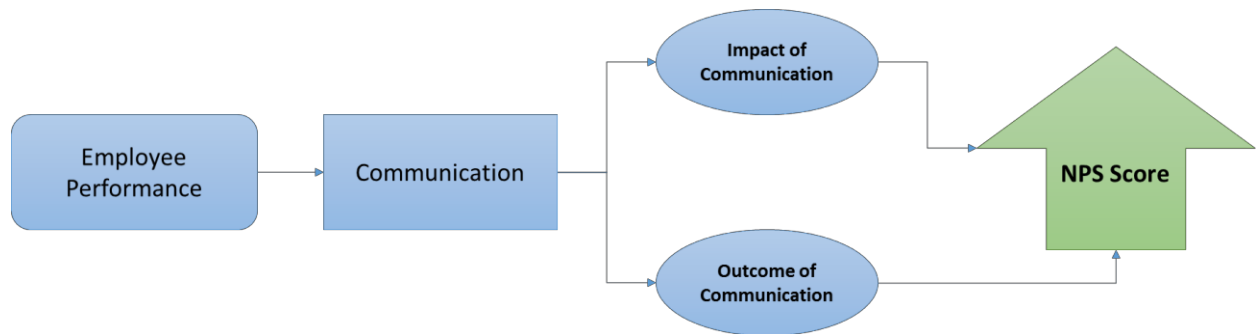


Net Promoter Score (NPS<sup>®</sup>) is a popular single measure which helps determine customer's willingness to recommend a company's products or services to others. It is an indirect means of measuring the level of customer satisfaction with its product offerings. NPS<sup>®</sup> is calculated based on responses to the question of likelihood of recommending a product or service of a company to others. Based on their response, respondents are classified into three categories namely, Promoters, Detractors, and Passives.

NPS<sup>®</sup> has been established as an effective measure for improvement of Service Quality, which further increases customer satisfaction and enhances loyalty. Enhanced loyalty is expected to assist higher growth in revenue, which depends on superior internal service quality and further improves employee performance.

Bringing a new client costs a company 5-7 times more than maintaining an existing relationship (Keiningham, 2005). Also, loyal customers spend 5-6% more money on products or services of a company than the disloyal ones. Recognizing the risk of dissatisfaction of customers, companies attach great importance to communication/interaction with them. A continuous engagement with customers helps gain confidence of the customers that the company cares for them and expects to improve its services based on their feedback.

**Figure 2 Effects of communication on NPS<sup>®</sup>**



This paper attempts to establish the intermediating role of communication in affecting NPS<sup>®</sup> scores and to understand customer sentiments or customer feedback about the products and services offered.

### **ASSOCIATION BETWEEN NPS<sup>®</sup> AND REVENUE**

It is a well-established fact that there is a strong correlation between NPS<sup>®</sup> and revenue generated by a company. The relationship is stronger in some industries than others. It is mostly dependent on the following factors for growth:

- a) The industry includes a substantial number of players, so customers have a real choice
- b) Network effects are minimal, so customers can easily switch providers
- c) The industry is mature, with widespread adoption and use of its products or services

In instances where these conditions are not met, the relationship may be weaker. The industry in which our client operates demonstrates these characteristics and is very sensitive to each of them.

Figure 3 Relationship between NPS<sup>®</sup> and revenue growth.



It is investigated and proven by research conducted by Bain & Co. that companies whose NPS<sup>®</sup> is higher than other competitors by percentages as low as 5-10c%, can achieve as much as 200% growth in their revenue. (Bain and Co., 2019)

Hence, NPS<sup>®</sup> is one of the most important metrics for the organization to grow and sustain in the long run. This emphasizes on the importance of devising ways and means to ensure that NPS<sup>®</sup> scores keep rising for the organization.

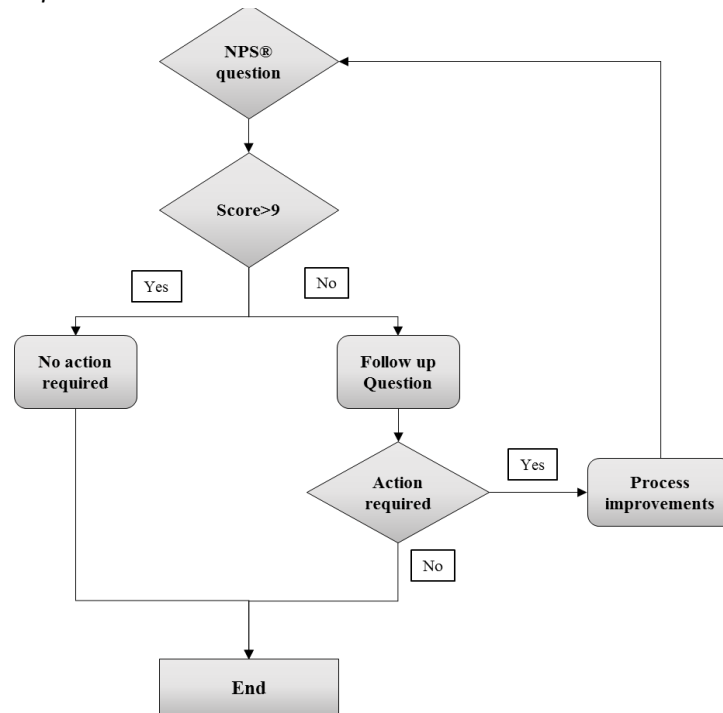
### DATA FOR ANALYSIS

The implementation of NPS<sup>®</sup> survey was classified into six stages; which are, Customer profiling, Questionnaire design, Surveys (Data Collection), Analysis, Circulation of information to relevant stakeholders, and follow-up action items, which also included measurement of outcomes subsequently. The feedback loop from the analysis stage to follow-up was designed to ensure that there is a timely communication with the Client’s customers based on their NPS<sup>®</sup> score, action taken, and the resultant scores measured in subsequent cycles.

NPS<sup>®</sup> surveys were conducted by a team which was independent of the operations of the Company. Follow-on feedback surveys were recommended for respondents who had scored less than 9 in the NPS<sup>®</sup> survey (Passives and Detractors). The feedback surveys were conducted by the operations team responsible which had a better understanding of specific issues that could potentially be raised, for resolving the issues as well as for redesigning the internal processes. Further, having different teams to capture NPS<sup>®</sup> score and feedback subsequently helps to avoid conflicts of interest/influence respondent biases of NPS<sup>®</sup> score.

Information for the previous quarter would then be compared with NPS<sup>®</sup> scores of the current quarters to see whether these were impacted or not.

Figure 4 Flow of the NPS<sup>®</sup> process



It was expected that the feedback surveys would not merely ask the reasons for dissatisfaction but also probe and ask for information that could help mitigate the issues causing lower satisfaction. Many times, such feedback did not require any further action from the operations team. This study examines whether intervention through feedback had any impact on the NPS<sup>®</sup> scores in the subsequent quarter irrespective of whether it was actionable or not. For this, the feedback has been classified by the operation team into actionable and non-actionable buckets.

For the purpose for analysis of the impact of communication on the scores, respondents having responses from the previous quarter as well as current quarter were used.

Out of a total of more than 3,000 clients, responses were considered for around 750 respondents who had provided responses consistently over time. Of these, a total of 392 respondents were reached for follow up feedback as they had low NPS<sup>®</sup> scores.

*“This study examines whether intervention through feedback had any impact on the NPS<sup>®</sup> scores in the subsequent quarter irrespective of whether it was actionable or not.”*

The respondents who had provided feedback were further analyzed using qualitative analysis techniques. Commonly used techniques such as coding, tokenization, sentiment analysis, bucketing, etc. were used to

classify the responses. Intensity of the responses was ignored for this study since action was expected to be taken on each and every response irrespective of the intensity of the response.

All the respondents who had mentioned price as one of the major reasons for their dissatisfaction or rating were eliminated from the data for further analysis. For the remaining responses, data was classified into three groups which are Negative response, Neutral response, and Positive response. This helps in identifying whether there is any relation between change in score and the type of feedback provided by the respondents in the previous quarter. It is assumed that the required corrective action was taken by the operations team to ensure that issues raised by the respondents were duly addressed.

Further analysis provides insights into whether an intervention and type of feedback have any impact on the subsequent NPS<sup>®</sup> scores.

## ANALYSIS

The analysis was focused on identifying the impact of intervention or feedback on the subsequent quarter score for respondents. The mean scores obtained for respondents who were interviewed in any two subsequent quarters were compared before and after the intervention or feedback. Since the sample size met the criteria required for verification of whether the difference between means of two groups is significant or not, t-test was performed.

Below are the outcomes for t-tests performed for all the responses interviewed in consecutive quarters irrespective of intervention and all the responses for whom there was an intervention.

Figure 5 Output of t-test on respondent samples

All Respondents t-Test: Paired Two Sample for Means			Only Respondents without Feedback t-Test: Paired Two Sample for Means			Only Respondents with Feedback t-Test: Paired Two Sample for Means		
	Q0Score	Q1Score		Q0Score	Q1Score		Q0Score	Q1Score
Mean	6.293	6.922	Mean	7.679	7.392	Mean	5.087	6.510
Variance	6.477	8.540	Variance	0.823	7.341	Variance	8.156	9.215
Observations	750	750	Observations	355	355	Observations	392	392
Pearson Correlation	0.187		Pearson Correlation	0.087		Pearson Correlation	0.150	
Hypothesized Mean Difference	0.000		Hypothesized Mean Difference	0.000		Hypothesized Mean Difference	0.000	
df	749		df	354		df	391	
t Stat	-4.924		t Stat	1.947		t Stat	-7.331	
P(T<=t) one-tail	0.000		P(T<=t) one-tail	0.026		P(T<=t) one-tail	0.000	
t Critical one-tail	1.647		t Critical one-tail	1.649		t Critical one-tail	1.649	
P(T<=t) two-tail	0.000		P(T<=t) two-tail	0.052		P(T<=t) two-tail	0.000	
t Critical two-tail	1.963		t Critical two-tail	1.967		t Critical two-tail	1.966	

It can be observed that for all respondents put together, the mean score increased and with a p-value of less than 0.05, the increase in mean score was significant. For respondents from whom no feedback was captured, the mean scores decreased. However, the decrease was not as significant as in other cases since the p-value of 0.026 is relatively closer to 0.05. Respondents, for whom there was an intervention or feedback after the NPS<sup>®</sup> score, the mean scores increased significantly, and the increase in mean scores was significant as p-value was less than 0.05.

We intended to use regression to predict whether intervention will have an impact on the scores obtained in subsequent quarters. The total respondent sample of 750 was split into two groups which are Control group having total of 525 responses and a test group having total of 245 responses.

The variables under consideration were as follows:

- a)  $Q_0$  score – This variable contains score provided by respondent in the Quarter  $Q_0$ .
- b) Feedback – Bifurcation of respondents based on whether feedback was obtained from each respondent or not
- c)  $Q_1$  score – This variable contains score provided by each respondent in quarter  $Q_1$  subsequent to the intervention
- d) Actual score – Difference between scores of  $Q_1$  and  $Q_0$ , a score of 0 implies that score for  $Q_1$  is greater than or equal to that obtained in  $Q_0$ . A score of 1 implies that score for  $Q_1$  is less than or equal to that obtained in  $Q_0$ .
- e) Predicted score – This is the predicted score of 0 or 1 which predicts whether score for  $Q_1$  will be greater than, equal to or less than the score for  $Q_0$ .

As the outcome variable is a dichotomous variable having values either 0 or 1, and the independent variables are also discrete variables, we used a logistic regression to predict the increase or decrease in scores.

Regression was performed on the control group and regression equation was derived. This was then used to test the outcomes on test data to check for accuracy of the model.

It was found that for respondent set containing all the respondents, the logistic regression provides an accuracy of 51% to predict the accurate result of an increase or decrease in the NPS<sup>®</sup> score for the next quarter.

*Table 1 Hosmer-Lemeshow test statistics*

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Hosmer-Lemeshow test (Variable ActualScore):			
Statistic	Chi-square	DF	Pr > Chi <sup>2</sup>
Hosmer-L	0.000	3	1.000

The chi-square statistic of less than 0.05 suggests that the model is valid and accurate enough to be used for further predictions. The model outcome is that whether the scores predicted versus the scores actually obtained will be same or not.



## Side Effects of Communication: Intermediating Effect of Feedback Loop on NPS<sup>®</sup> Score

The coefficients of variables and the intercept are as follows:

*Table 2 Logistic regression outcome parameters*

Model parameters (Variable ActualScore):									
		Standard error	Wald Chi-Square		Wald	Wald	Odds ratio	Odds ratio	Odds ratio
Intercept	-20.719	7666.188	0.000	0.998	-15046.171	15004.733			
Q1Score	-74.283	5439.687	0.000	0.989	-10735.874	10587.308			
Feedback	0.853	2893.444	0.000	1.000	-5670.192	5671.899			
Q2Score	74.293	5389.098	0.000	0.989	-10488.145	10636.730			

Wald-chi square values less than 0.05 indicate that all the variables in the regression equation are significant.

The equation of model to predict whether the scores will increase over quarters after intervention is as follows:

$$\text{Predicted Score} = \frac{1}{(1 + \exp(-(-20.719 - 74.283 \cdot \text{Q1Score} + 0.853 \cdot \text{Feedback} + 74.292 \cdot \text{Q2Score})))}$$

After testing the regression over test data, it was observed that the model has an accuracy of about 53%, which can be increased in future based on the number of data points and addition additional variables such weightage to feedback, evaluation of feedback, etc.

Of the respondents who had provided feedback, after due classifications into three buckets, positive, negative and neutral, a t-test was performed to compare if the difference in the mean of the responses was significant for scores captured before the feedback was obtained and scores captured after the feedback was obtained.

*Figure 6 Comparison of means using t-test based on feedback*

Negative Feedback t-Test: Paired Two Sample for Means			Neutral Feedback t-Test: Paired Two Sample for Means			Positive Feedback t-Test: Paired Two Sample for Means		
	Q1Score	Q2Score		Q1Score	Q2Score		Q1Score	Q2Score
Mean	4.330	6.152	Mean	5.955	6.447	Mean	5.737	8.000
Variance	7.878	9.331	Variance	6.998	8.990	Variance	8.403	4.750
Observations	138	138	Observations	88	88	Observations	57	57
Pearson Correlation	0.267		Pearson Correlation	0.152		Pearson Correlation	-0.110	
Hypothesized Mean Difference	-		Hypothesized Mean Difference	-		Hypothesized Mean Difference	-	
df	137		df	87		df	56	
t Stat	-6.026		t Stat	-1.253		t Stat	-4.480	
P(T<=t) one-tail	0.000		P(T<=t) one-tail	0.107		P(T<=t) one-tail	0.000	
t Critical one-tail	1.656		t Critical one-tail	1.663		t Critical one-tail	1.673	
P(T<=t) two-tail	0.000		P(T<=t) two-tail	0.214		P(T<=t) two-tail	0.000	
t Critical two-tail	1.977		t Critical two-tail	1.988		t Critical two-tail	2.003	

It was observed that for respondents who provided a positive or negative feedback, the p-value is less than 0.05. Hence, the null hypothesis is rejected that means are equal for both samples. The difference between means for samples before and after the feedback is captured is significant. Also the difference is positive, which implies, the feedback has resulted in an increment in the scores for the respondents.

However, for neutral response in feedback, the p-value is at 0.10, which means the null hypothesis should be accepted. Hence, the difference between means of two samples is not significant.

The statistical tests validate the claim that any kind of intervention with the respondent between two quarter scores, results in an increase in the score for the subsequent quarter. This increase is significant for respondents having positive or negative feedback and is insignificant for respondents who provide neutral feedback.

## MAJOR RESULTS

NPS<sup>®</sup> scores for the Client showed significant improvements over time for which the NPS<sup>®</sup> scoring was adopted. The improvement could be attributed to the fact that instead of mere calculations of NPS<sup>®</sup> scores from surveys, the methodology focused more on the root cause analysis of the scores. This helped the Client in identifying the exact reasons for low scores as well as triggers for higher scores. For respondents who had provided a low rating, feedback was captured and corrective action was sought to be taken. In subsequent measures of NPS<sup>®</sup> scores, these respondents, showed significant improvements in the NPS<sup>®</sup> scores, clearly demonstrating that interventions through feedback surveys helped to increase the NPS<sup>®</sup> score for the organization as a whole.

*Table 3 Quarter over quarter NPS<sup>®</sup> scores after implementing feedback loops*

Description	Quarter 0	Quarter 1
Total number of respondents	750	
Number of respondents from whom Feedback was obtained	283	
Average score of all respondents	6.32	6.92
Average score of respondents from whom feedback was obtained	5.08	7.00
NPS <sup>®</sup> score of the Client	32%	38%

The number of respondents for whom feedback surveys were conducted increased, as the system evolved. However, the promoters were significantly higher than the detractors and hence, the overall NPS<sup>®</sup> score shows consistent improvement over time.

Our study demonstrated that an interaction through feedback has a positive impact on NPS<sup>®</sup> rating even when no further action was required.

## CONCLUSIONS

It is evident from the tests and regressions performed that an intervention with the respondent between two quarters resulted in increase in the score for subsequent quarter. The increment was higher and significant in case of respondents who have positive or negative feelings or feedback about the services and the brand, whereas it is lower and insignificant for respondents who share a neutral feedback or no feelings about the services and the brand.

The regression performed reinforced the fact that the improvement or reduction in the NPS® scores subsequent to interventions could be predicted and with an accuracy of 53% based on previous quarter scores, interventions performed or not and subsequent quarter scores.

One outcome of this study is that organizations should make it a part of their service quality roadmaps to establish interaction protocols with their customers/respondents subsequent to the NPS® scoring, on a frequent basis and also take corrective actions based on their feedback. This leads to a direct impact on the NPS® score of the organization which improves organizational performance.



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**DATAWISE**<sup>®</sup>'s business analysis services support the full spectrum of clients' needs with services directed mainly at helping companies discover opportunities for improvement through use of analytical capabilities. We offer analytical services in the following areas:

**Strategic Analytics:** Alignment of strategic intent with actual work, requiring strategic analytics to answer key decision support questions such as whether to enter into a new segment of business or not, whether to reach new customers or not, and other go, no-go decisions.

**Behavioral Analytics:** Assistance in determining the 'why' and 'how' of a customer behavior (rather than the 'what') in order to ensure that marketing plans yield the desired results through capturing customer events and actions over time and using these stored interactions to determine typical behavior and deviations from that behavior.

**Tactical Analytics:** Tactical analytics models that we deploy are typically short-term in nature, and are focused on answering immediate questions rather than aligning to a longer-term goal.

**Predictive Analytics:** We created complex multi-dimensional models that collate data generated from several interaction points to create models that enable the prediction of future events to help identify of both risks and opportunities.

**DATAWISE**<sup>®</sup> has also developed proprietary analytics models OPTLIOX<sup>™</sup>, CREST<sup>™</sup>, Infinity<sup>™</sup> and DATTAB<sup>™</sup>, catering to specific customer needs.

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