



Pay Now, Gain Later: Analyzing the Effects of Higher Pay Scales in Business Performance

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ABSTRACT

This study examines supervised learning methodologies that retailers can employ to gauge the effectiveness of different monetary compensation packages in overall store performance. This study is motivated by the high turnover rates experienced in the retail industry over the last few years, which has led retailers to constantly evaluate their compensation offerings. In collaboration with a national retailer with over 400 stores in the US, we built and assessed traditional inferential models to analyze the effects of higher pay scales. We compared the treatment (pilot) stores against a control (traditional) set and determined whether the Store Pay Pilot project has had positive results as compared to traditional stores (e.g. stores without increased pay scales). We highlight the magnitude of the effects so that HR managers can use these estimates as a decision-support mechanism for their upcoming planning horizon.

INTRODUCTION

Nearly half of all organizations have seen an increase in attrition rates in recent years. More specifically, the retail sector has experienced high turnover rates over the last few years, resulting as the industry with the second highest turnover in 2017. Thus, companies face the need to design effective human resources policies to retain and replace talent. 96% of employees rate compensation as either “very important” or “important”. As such, compensation plays an extremely important role in understanding why employees leave and appealing to their needs.

Due to such an increasingly competitive environment, a national retailer implemented a new compensation scheme aimed to be better aligned with the overall market. The retail company designated 40 stores to the Store Pay Pilot program (pilot stores). Traditional stores without the Store Pay intervention were used as control stores to test the effectiveness of the new compensation scales.

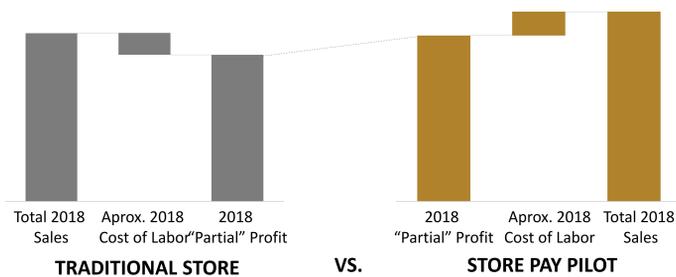


Figure 1. Business Context

This study aims to leverage analytics to answer the following **research questions**:

- Do different compensation packages lead to differences in store performance?
- Do stores with higher compensation schemes (store pay pilot) have positive results (e.g., better sales performance by store, increase in store team retention, etc.) as compared to stores with traditional compensation packages?

LITERATURE REVIEW

Machine learning has been thoroughly applied to understand attrition and build robust prediction models, yielding high accuracy models (accuracy between 74% to 88%). As opposed to attrition, the relationship between compensation and employee performance is less clear. Recent studies have focused on understanding different compensation schemes, revealing varying effects.

	Study	Motivation	Algorithm(s) Used
Attrition Prediction	Ajit (2016)	Predict attrition levels in a global retailer	Logistic Regression, Naïve Bayes, Random Forest, KKN, LDA, SVM, XGBoost
	Alao & Adeyemo (2013)	Predict attrition at a higher education institution in Nigeria	C4.5, C5, REPTree and CART
Commission Schemes	Wilson et al. (2015)	Examine salary vs. commission pay schemes on retail salesperson productivity	Linear regression
	Viswanathan et al. (2018)	Compare cash only vs. cash + non-cash bonus for salespeople	Regression (panel design)
	Kesavan, Kuhn & Lee (2018)	Compare incentive plans amongst retail store managers	Difference-in-differences (DiD)
Both	Our Study	Examine base salary increases	Linear, logistic and uplift model

Table 1. Literature Review Overview

Our study is novel because it focuses on examining the effect of base salary increases and emphasizes the magnitude of the effects to aid HR decision-makers.

METHODOLOGY

We used inferential models to understand the effect of the Store Pay Pilot program in terms of key three business performance measures: a) total actual sales by store; b) total partial profits by store; and c) employee attrition. We included several controls to account for differences at both the store and employee level.

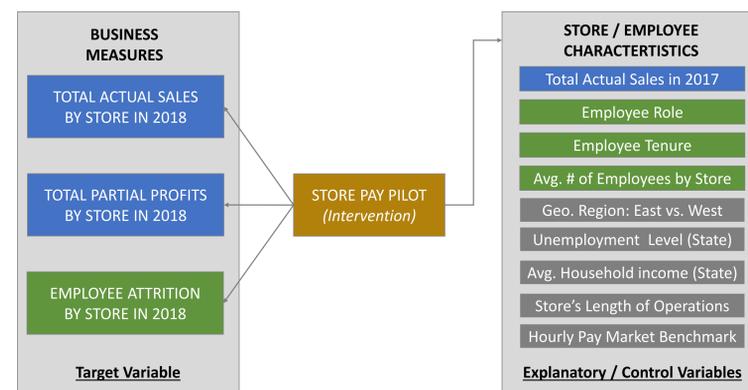


Figure 2. Study Design

We used linear, logistic and uplift models to gauge the effectiveness and magnitude of the Store Pay Pilot program (intervention). These models were most effective for our study given that the coefficients are more interpretable compared to other supervised learning methodologies, thus can aid HR decision-making.

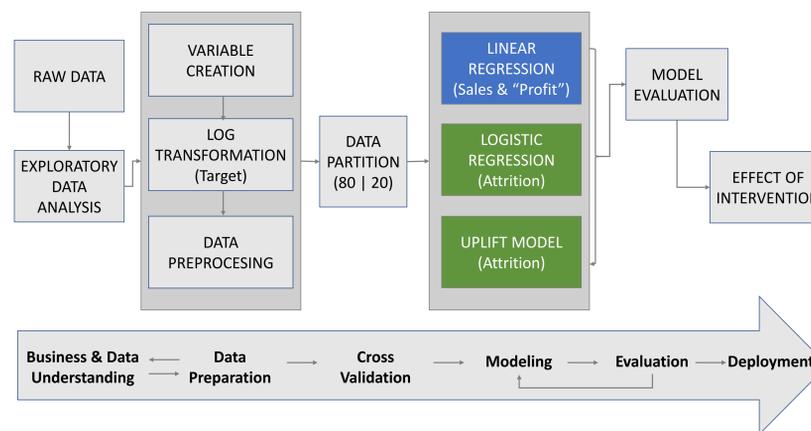


Figure 3. Analytical Process Workflow

DATA

The data used for this study was provided directly by the national retailer. Data was collected at the individual store level (n = 80 stores) and the sample was evenly split between pilot stores (n = 40 stores) and traditional stores (n = 40 stores). Features by store included actual and projected monthly sales for 2017 and 2018, geographic information (e.g., state, zip code, region), opening hours, date of opening and a compensation market benchmark by store (average market hourly pay of an employee with 2 and 3 years of retail experience, collected from the Economic Research Institute Compensation Data).

The national retailer also provided data for all employees at the 80 stores during 2018, including all existing employees, new hires and voluntary/involuntary terminations. Data at the individual employee level also included role/title (e.g., store manager, sales representative, etc.), actual hourly or yearly pay, date of hire and termination date (if applicable).

Variable Creation:

Partial Profit by Store: Total Actual Sales in 2018 – Direct Cost of Labor (average salary by role * average number of employees in each role)

RESULTS

Using cross validation techniques, we confirmed that our models were not overfitting the data. Linear models were evaluated based on R², while the logistic model was evaluated based on AUC. Linear models yielded stronger predictive capabilities, compared to the logistic model. The uplift model provided attrition predictions at the individual employee level.

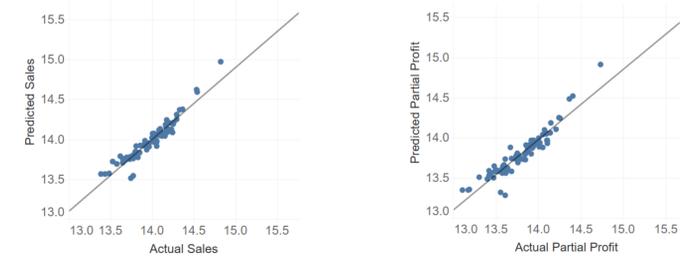


Figure 4. Linear Regression Model Accuracy

We focused on examining the magnitude of the effects on three business metrics to aid HR managers with their decision making. We find statistically significant effects for total actual sales and marginally significant effects in employee attrition.

Business Measure	Effect of Intervention	Average Effect (beta)	Range of Effect (95% C.I.)	Model Strength
Total Actual Sales	p-value = 0.0152	~5% higher sales	1% to 9%	Adj. R ² = 0.8993
Total Partial Profits	p-value = 0.0596	~5% higher profits	0% to 10%	Adj. R ² = 0.8732
Employee Attrition	p-value = 0.0669	~ 17% lower odds of attrition	32% lower to 1% higher	AUC= 0.6843

Table 2. Business Effects



Figure 5. Attrition Reduction by Role

CONCLUSIONS

We found evidence that different compensation schemes lead to differences in overall store performance.

In terms of sales, we found a statistically significant difference between stores with the pay pilot program compared to traditional stores. Partial profit follows a similar pattern, yet the difference between the stores is only marginally significant. As such, we can conclude that pay pilot stores have **higher sales and partial profits**, when compared to traditional stores.

When examining attrition, we can conclude that, on average, store pay pilot stores have lower odds of attrition compared to traditional stores; however, this difference is not statistically significant at the 0.05 alpha level.

Overall, our results provide **evidence for extending the Store Pay Pilot program to more stores** across the United States, providing the HR professionals guidance for their upcoming planning horizon.

ACKNOWLEDGEMENTS

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