
i3 INTERNATIONAL
TM
INTELLIGENT VIDEO DRIVING PROFITS
CASE STUDY: SALES ANALYSIS
WOMEN
TRAINING
CLEATS
BASKETBALL
TRAINING
Champion

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Case Study: Sales Analysist

EXECUTIVE SUMMARY

Douglas Cumming, a tenured professor of finance and entrepreneurship at York University's Schulich School of Business was engaged by i3 International to analyze sales data collected from six sporting goods stores in the northeastern region of the United States. The data was collected between January 1, 2013 and May 9, 2013.

The data analyzed indicated the use of video technology is highly effective in improving sales results. In particular, the most conservative estimates show that the technology generated the following:

- an increase in total sales per hour by 29.27%;
- an increase in the number of transactions per hour by 14.74%;
- an increase in the average size of each transaction by 11.27%

A number of additional interesting findings, along with suggestions for ways in which the data can be used to further improve the effectiveness of sales efforts were made.

"...Although Modell's already had video surveillance in place, they were interested in determining if adding video analytics would impact sales results..."

Introduction

ABOUT MODELL'S SPORTING GOODS

Modell's Sporting Goods is America's oldest, family-owned and operated retailer of sporting goods, athletic footwear, active apparel and fan gear. Founded in 1889, the chain has grown to over 150 stores located throughout New York, New Jersey, Pennsylvania, Connecticut, Rhode Island, Massachusetts, New Hampshire, Delaware, Maryland, Virginia and the District of Columbia.

Although Modell's already had video surveillance in place, they were interested in determining if adding video analytics would impact sales results and if so, could the impact be convincingly proven. i3 proposed to conduct a controlled experiment to answer these questions.
The goals for the study were:

- To increase sales using business intelligence to drive positive behavioral changes;
- To increase conversion rates;
- Successfully integrate Aspect point of sales software with the i3 system;
- Measure dwell time and increase conversion rates in the "Mo's Zone"

Six Modell's stores were chosen for the study. Three were "treatment" (video analytics were employed) and three were "non-treatment" (video analytics were not employed). The study was conducted over a five-month period.

Design of Case Study

Data were collected in which three of six Modell's stores utilized information from video half-way through the sample period. All six stores employed video technology, whereby information was recorded on the following:

- Times at which customers entered and exited the store, including the direction in which they went;
- Whether the customer entered alone or as a couple, and
- Whether or not there were accompanying children, among other things.

Three of these six stores ("treatment stores") started to use this data on March 1, 2013 ("the post-treatment period") by adjusting promotion and sales techniques in response to information learned. The other three stores ("non-treatment stores") made no such changes.

A number of statistical techniques were employed to analyze the data. First used was a simple comparison of mean and median statistics. Stores that used the video were compared to those that did not, and the pre-versus post-March 1, 2013 period was examined. Second, graphic analysis was made for these different periods. Third, simple correlation statistics were determined across all of the variables in the data. Fourth, and most importantly, regression evidence was scrutinized to consider the impact of the technology, controlling for other things being equal. A well accepted regression technique, panel data regressions[1] was employed, with fixed effects across stores and time (each hour), and included a wide array of control variables.

[1] See, e.g., Badi Baltagi, 2008. Econometric Analysis of Panel Data, 4th Ed., Wiley.

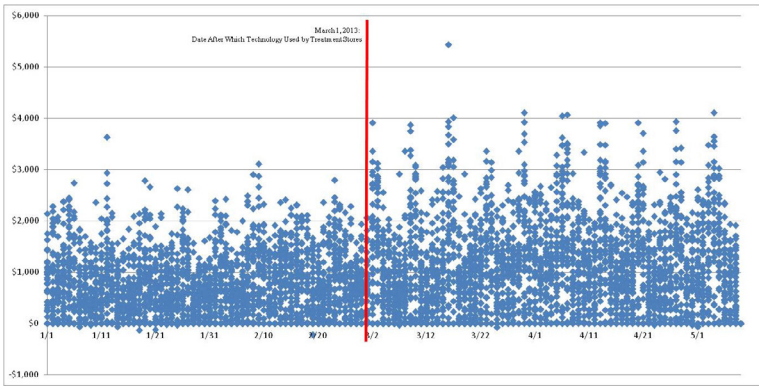


Figure 1.

Total Sales by Hour for Treatment Stores that Used Surveillance Technology

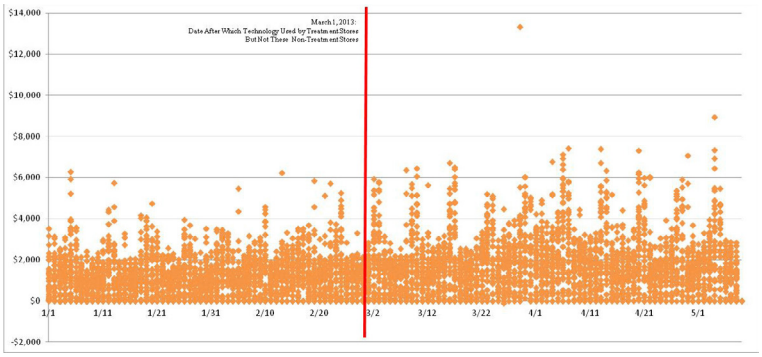


Figure 2.

Total Sales by Hour for Non-Treatment Stores that Did Not Use Surveillance Technology

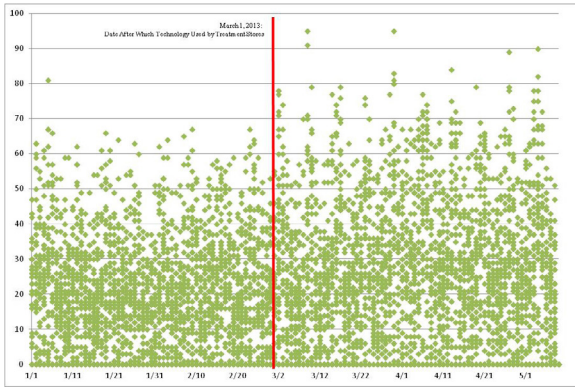


Figure 3.

Total Transactions Per Hour for Treatment Stores that Used Surveillance Technology

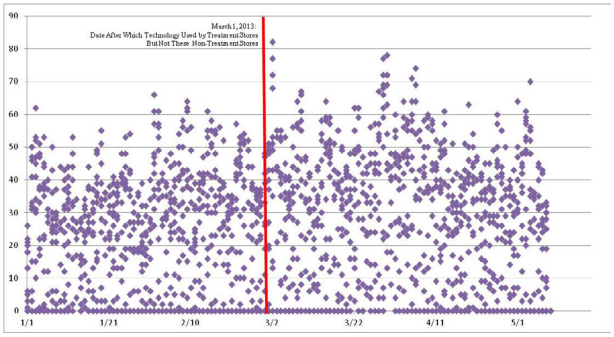
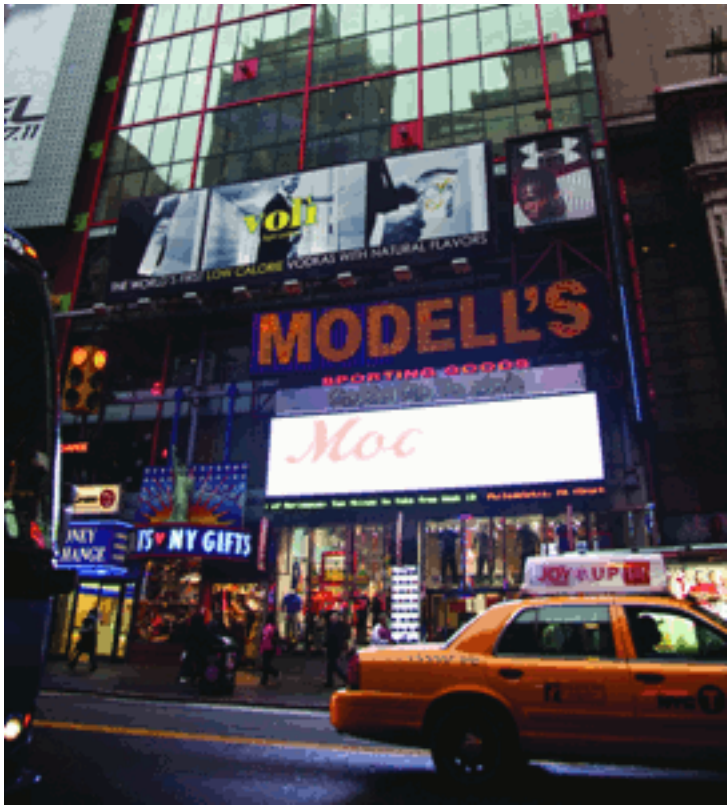


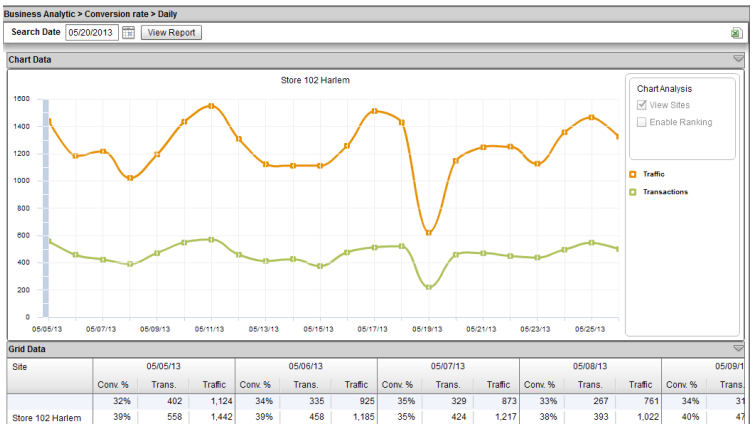
Figure 4.

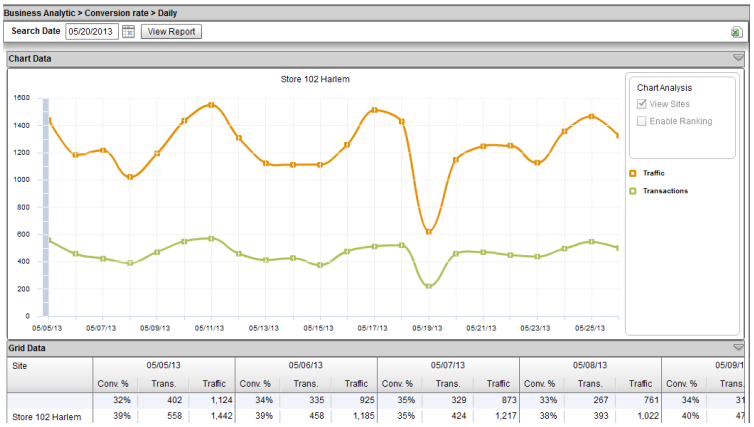
Total Transactions Per Hour for Non-Treatment Stores that Did Not Use Surveillance Technology

Results of the Case Study

The data indicated the use of video analytics is measurably and highly effective in improving sales results. In particular, video analytics technology increased the stores' total sales per hour by 29.27%, relative to the average sales per hour among the treatment stores in the pre-treatment period. Also increased were transactions per hour by 14.74%, relative to the average transactions per hour among the treatment stores in the pre-treatment period. The average size of each transaction increased by 11.27% relative to the average transaction size per hour among the treatment stores in the pre-treatment period. These estimates are conservative and are based on panel data regression techniques with fixed effects by store and hour and a complete set of control variables.



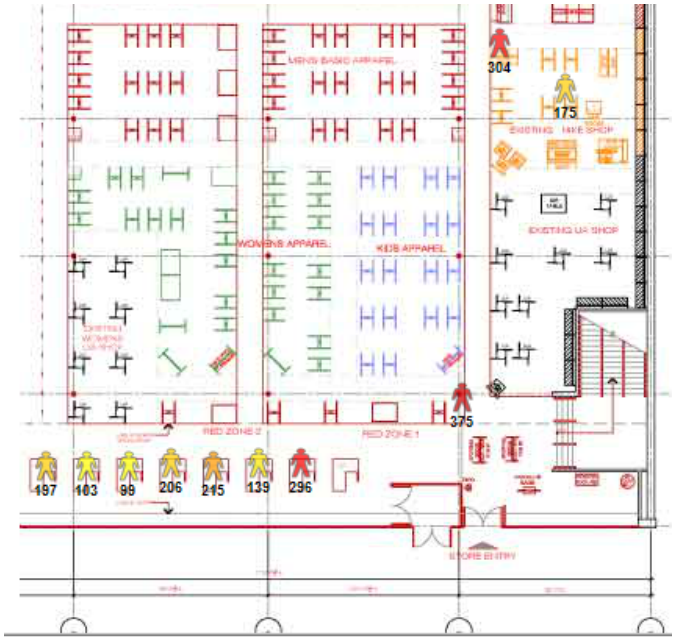




A simple comparison of the data across time showed that the percentage increase in total value of transactions, number of transactions, and average value of transactions was greater among the stores that made use of video analytic technology compared to those that did not. The differences in means and medians were statistically and economically significant, and are apparent in a graphical representation of the data.

The panel data regression evidence, which controls for other things being equal, and considers alternative possible effects, provided a precise assessment of the value of video analytic technology. Under Dr Cumming's most conservative estimates, he found that relative to the average amounts in the data, the technology increased total sales per hour by 16.93%, increased the number of transaction per hour by 9.69%, and increased the average size of each transaction by 9.59%. These effects were statistically significant at the 1% level, meaning that there is less than a 1% chance that these findings are due to random chance.

The data highlight a number of other interesting patterns pertaining to the number of customers entering and exiting the stores, the directions in which they travel, and the effect of couples and children. The data analyzed are consistent with the view that this technology could be utilized in a very profitable way with the existing set of information that has been gathered. For instance, the effect of specific types of advertising and product placement in one store and its impact on conversion rates could be examined at different points in time during the day, for singles versus couples, and for adults versus children. These types of targeted interventions could be analyzed to promote increased sales thus maximizing marketing efforts.



	Area	Traffic
	Register 1	197
	Register 4	206
	Register 5	215
	Basketball	281
	Register 7	296
	Nike	304
	MOS Zone	375

Accuracy

As stated by Dr Cumming there is a less than 1% chance that the results shown by the study were due to random occurrences. Alternative possible explanations have been excluded, thus providing solid information that, indeed video analytics impact sales efforts positively… insofar as actions are taken on data provided by the technology.

Figure 5.

Change in Average Levels of Total Sales, Total Transactions, and Size of Transactions, Pre-Treatment Period versus Post-Treatment Period, Raw Data not Controlling for Other Things Being Equal

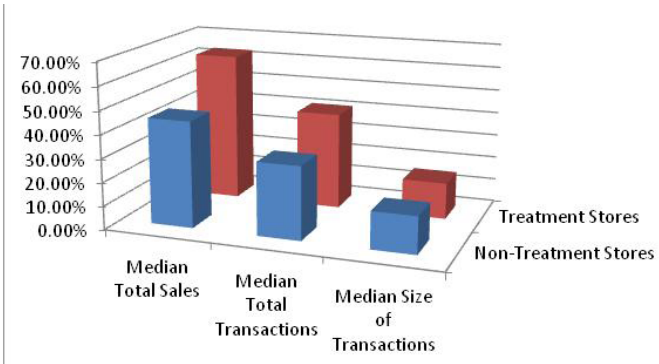
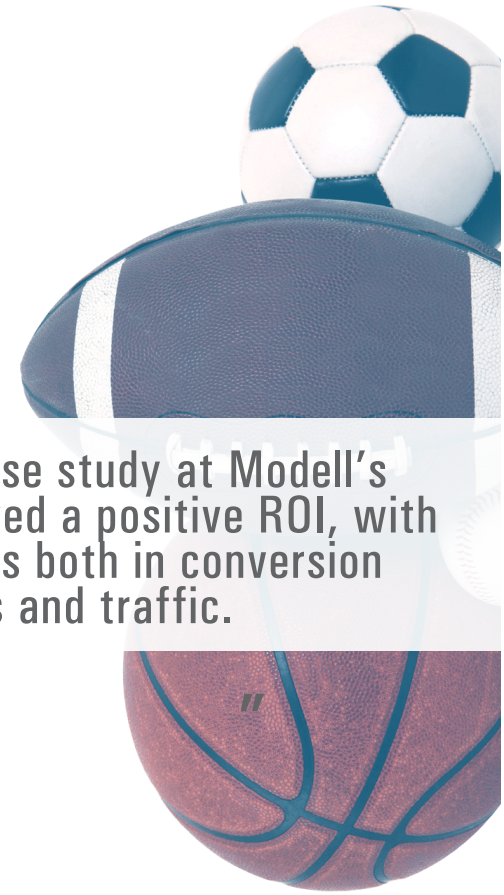


Figure 6.

Change in Median Levels of Total Sales, Total Transactions, and Size of Transactions, Pre-Treatment Period versus Post-Treatment Period, Raw Data not Controlling for Other Things Being Equal



"The case study at Modell's proved a positive ROI, with increases both in conversion rates and traffic.

Conclusion

Video analytics alone are not a panacea. Video must be viewed and proper behavior modification of personnel implemented to reap the benefits of the technology. The case study at Modell's proved a positive ROI, with increases both in conversion rates and traffic. In March Modell's implemented strategies to achieve real-world improvements in sales. A contest was staged between 3 stores in which variables such as deliveries, management visits, or employee absences were noted for affect on dwell times and conversion rates. The stores which employed modifications based on data collected experienced higher sales and increased staff efficiency. Truly, the investment in video analytic technology is an important tool in the hands of retailers who wish to positively impact their bottom line.