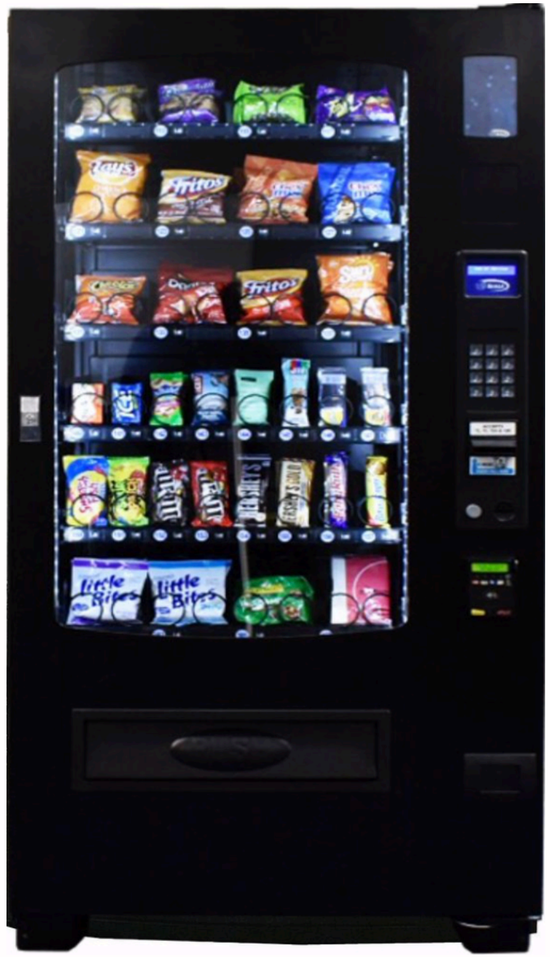
VENDEX

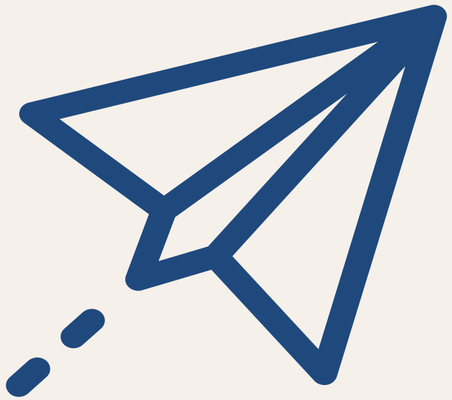
SEIZING THE BUSINESS POTENTIAL OF VENDING MACHINES



ESADE BUSINESS SCHOOL

Around the world - 2020

GOAL: INCREASE VENDEX PROFIT BY ANALYSING POTENTIAL LEVERS



METHODOLOGY

EXECUTIVE SUMMARY

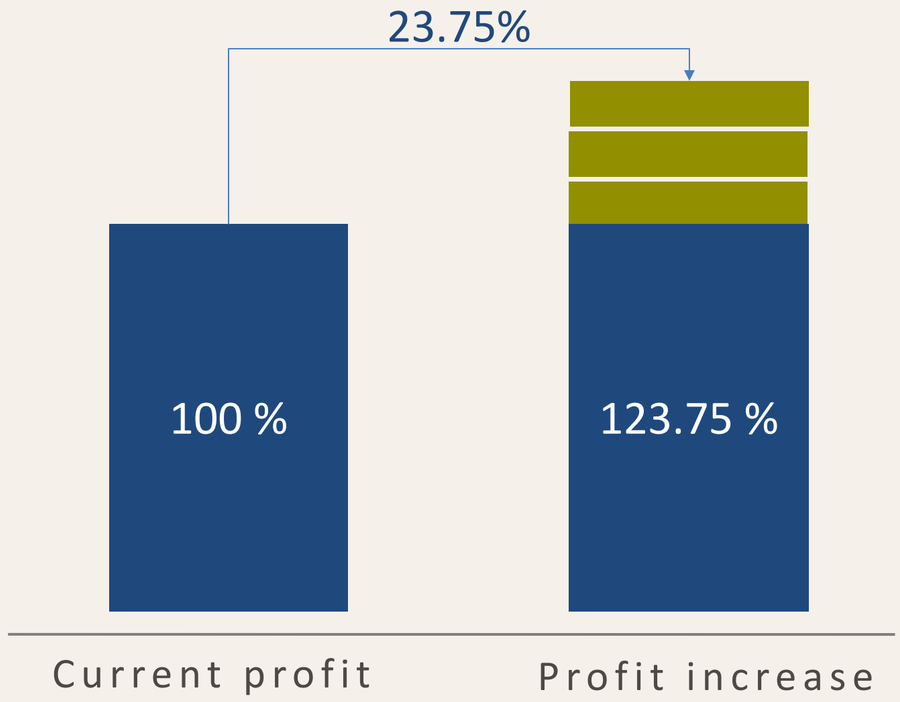
In this document we present our data-driven and research based solutions to increase profit for VENDEX

Our team identified improvement levers across three dimensions:

1. Benchmarking machines against a predicted location score
2. Optimizing product assortment based on increasing the presence of high-performing products
3. Bundling of products by creating discounted menus

As a unit of quantifying improvement potential we chose operating profit. In this context, operating profit is defined as profit before taxes (EBT).

In total, we found an immediate operating profit improvement potential of ca. 23.75% for Vendex.



STRATEGY

- OPTIMIZATION LEVERS
  - LEVER 1: LOCATION
  - LEVER 2: ASSORTMENT
    - 2.1. POSITION
    - 2.2. SEASONABILITY
  - LEVER 3: PRODUCT BUNDLING
- IMPACT
- SUMMARY AND NEXT STEPS

OPTIMIZATION LEVERS

*We have identified three levers which when combined will **increase Vendex's profit considerably.***

LEVER 1

Location-based performance and swap analysis

LOCATION

LEVER 2

Product selection and product position based on seasonability

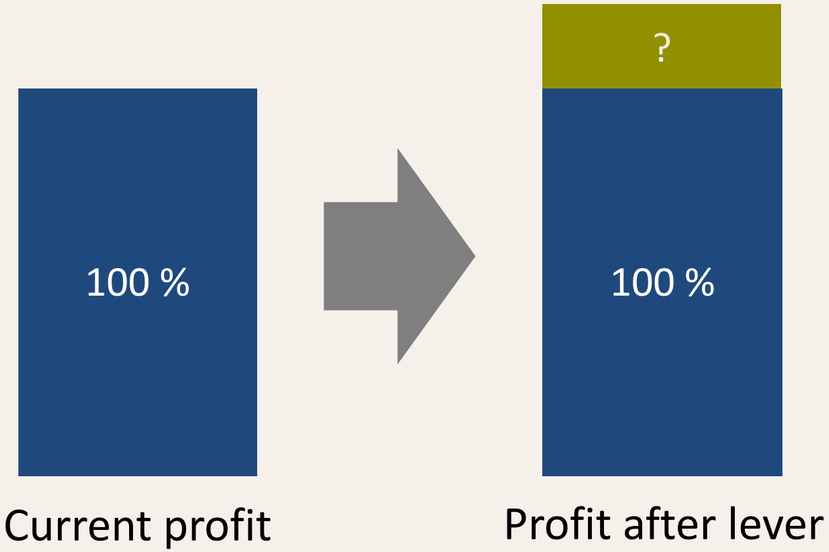
ASSORTMENT

LEVER 3

Bundle products with high sales correlation to exploit demand

PRODUCT BUNDLING

LEVER 1: LOCATION



LEVER 1: LOCATION

We found that the location parameter have a high influence on the daily profits a machine is generating.

Location Parameter	Best performing	Worst performing	Difference (%)
Number of nearby Vendex machines (by *weighted average*)	19	14	36 %
Transport vs. Non-Transport (*by average*)	18	11	64 %
Population density (5km) (*top vs bottom 20 %)*	18	15	20 %
Income average of Area (*top vs bottom 20 %)*	17	15	13 %
Total number of routes (*by weighted average of log_routes*)	17	12	42 %
Hotels in that area (*by weighted_avrg*)	20	14	43 %
Premium hotels in that area (*by weighted_avrg*)	20	14	43 %

LEVER 1: LOCATION

Running a regression model to identify those machines that significantly underperform based on their location-parameters.

GOAL: Identify machines that underperform with respect to their location parameters

1

Location based performance
Build GLM to predict daily profit per machine based on location parameters and compare to actual profit

2

Problems with Machines – Swap
Swapping machines with big ones to eliminate the Delta Profit

Approach*

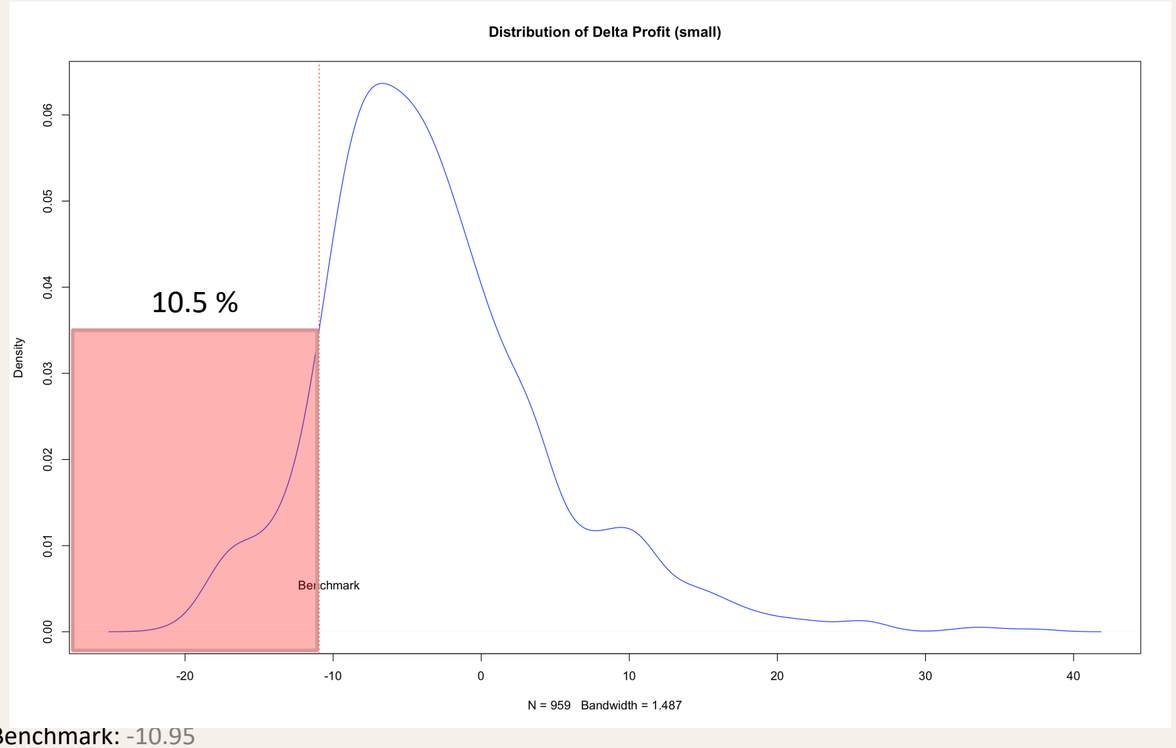
- Num Vendex Machines
- Transport
- n_density (5km)
- Income Average
- Log_routes
- Hotels
- Premium Hotels

Daily Profit per Machine

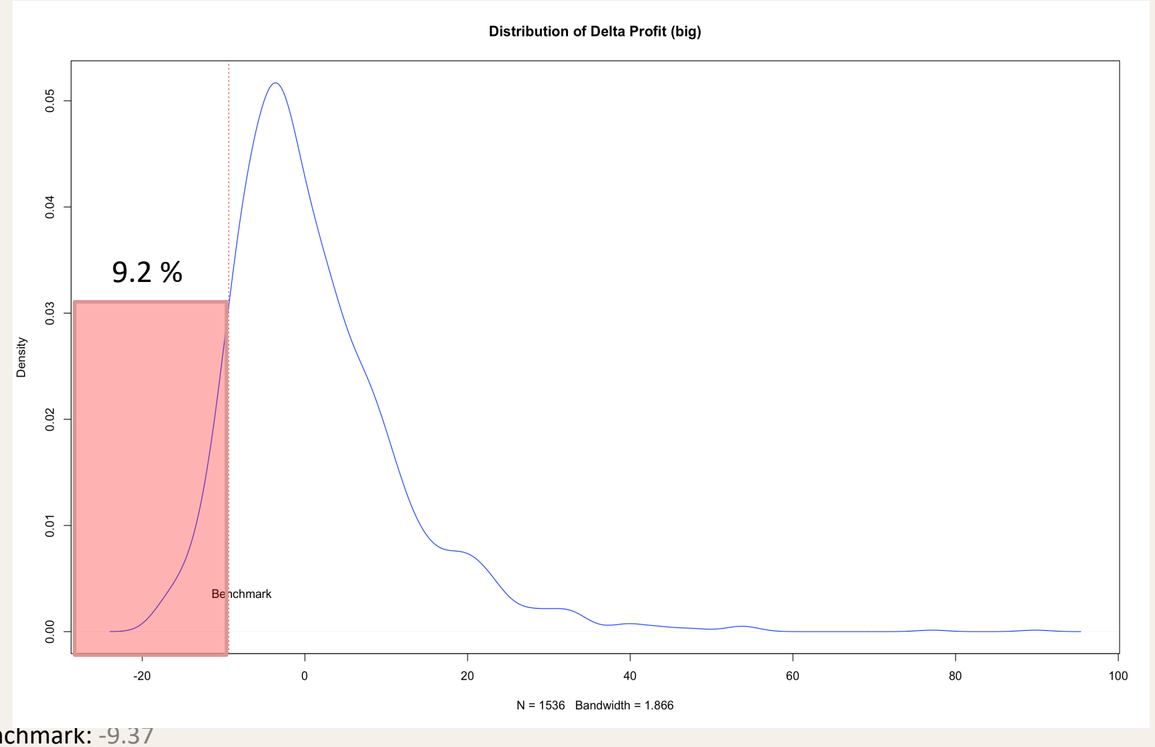
*Adjusted by machine size, by running two different glm for each machine size

LEVER 1: LOCATION

Looking at the distribution of Delta Profit we found that there is a significant amount of machines that perform below their machine size benchmark.***



Benchmark: -10.95



Benchmark: -9.37

In total there are 243 underperforming machines.

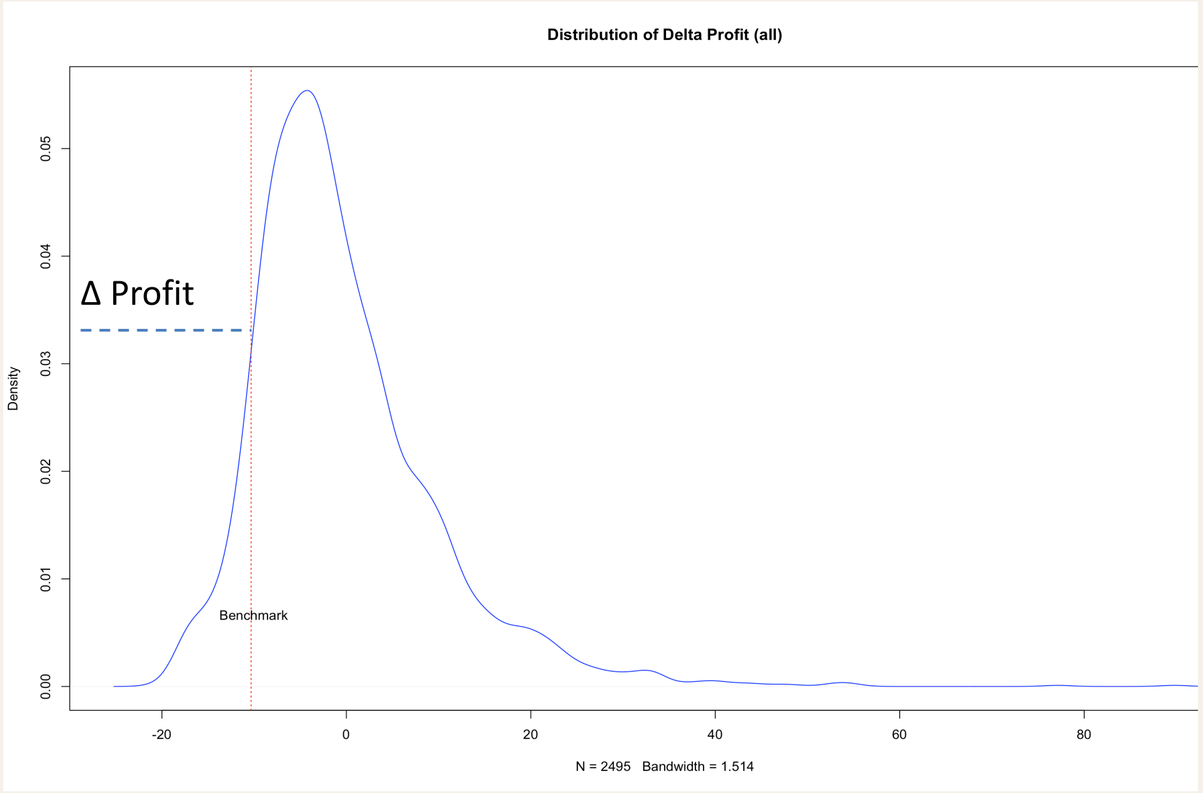
* Delta Profit is defined as the difference between actual and predicted profit based on location parameters.

** The benchmark was calculated by taking the average of delta profit and subtracting its standard deviation.

LEVER 1: LOCATION

Decreasing Delta Profit will have a strong impact on overall profit.

Distribution of Delta Profit (all)



9.7 % of all the machines are underperforming. These contribute to 607.360 USD of yearly Profit.*

A solution that will minimize Delta Profit to the average level of daily profit will increase yearly profit by **4.8%**.**

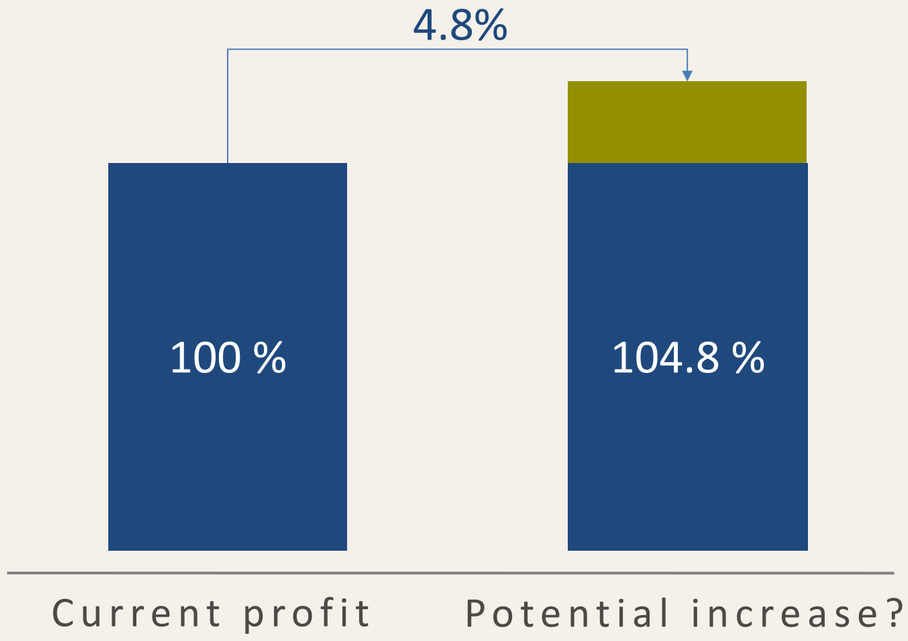
* Assuming sales of Jan-March remain constant.

* No potential costs included yet

LEVER 1: LOCATION

To quantify a solution be more difficult than previously thought.

Possible Reasons such as:
- Maintenance Problems
- Dirty/Broken (i.e. Graffiti, Vandalism)
- Out of Stock (Restocking)
- Swap big vs small machines
- Product Assortment



Possible Solutions such as:
- Early Warning System
- Send a Vendex worker to clean
- Restocking Warning System
- Product Assortment (Lever 2)
- Product Bundeling (Lever 3)
- **Profit Analysis for Swaps**

PROBLEM: How can only the underperforming machines be targeted?

Solution: Find a solution that is directly linked to Delta Profit – just solving this specific problem.

LEVER 1: LOCATION

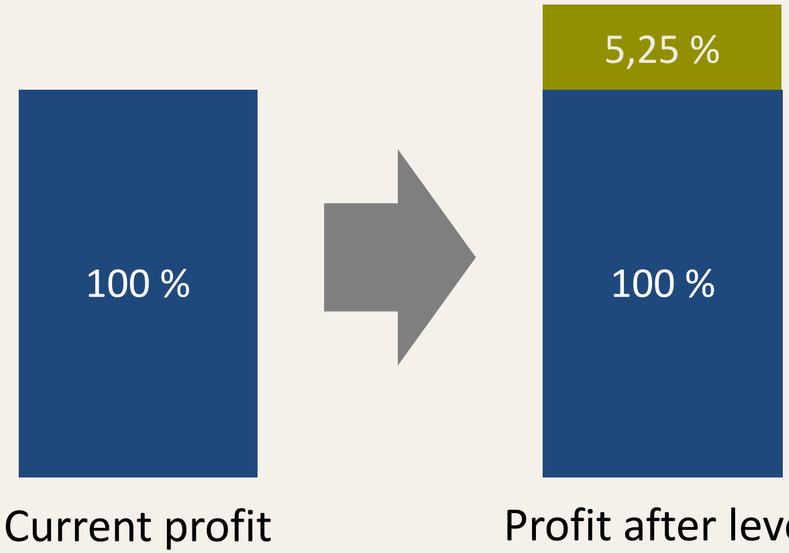
Swapping the underperforming machines will have a strong impact on overall profit.

ASSUMPTION 1:
Small underperforming machines might have several reasons for their bad performance, but when replaced with big machines, they will generate the average yearly profit of big machines.

ASSUMPTION 2:
Big underperforming machines are more likely to have technical issues and have been damaged

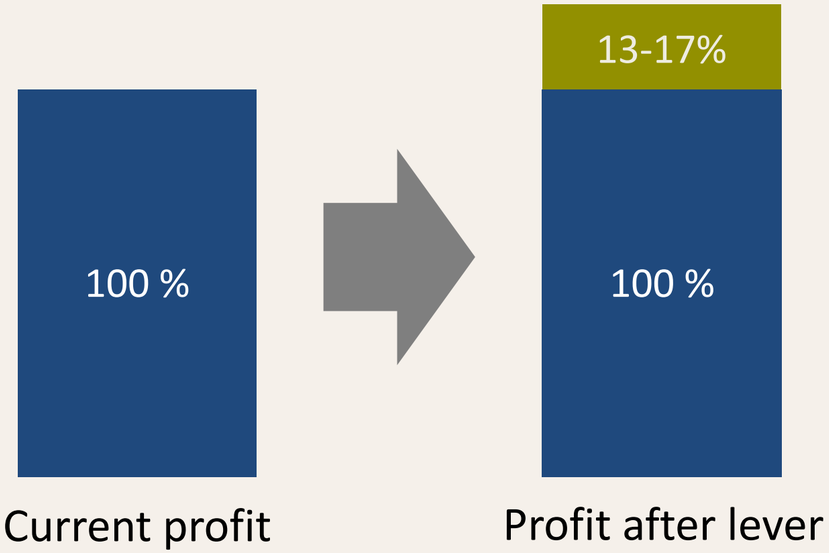
RESULTS:

	Current Profit	Future Profit*	Difference
Small Machines	4,058,209	4,363,054	304,845
Big Machines	8,921,033	9,298,098	377,065
Total	12,979,242	13,661,152	**5,25 %**



* Taken the initial costs of 500 USD per swap into account.

LEVER 2: ASSORTMENT



LEVER 2: ASSORTMENT

2.1. Position: *Where to collocate each product item in an average small and big machine.*

DATA:

BIG MACHINE: 79 SLOTS

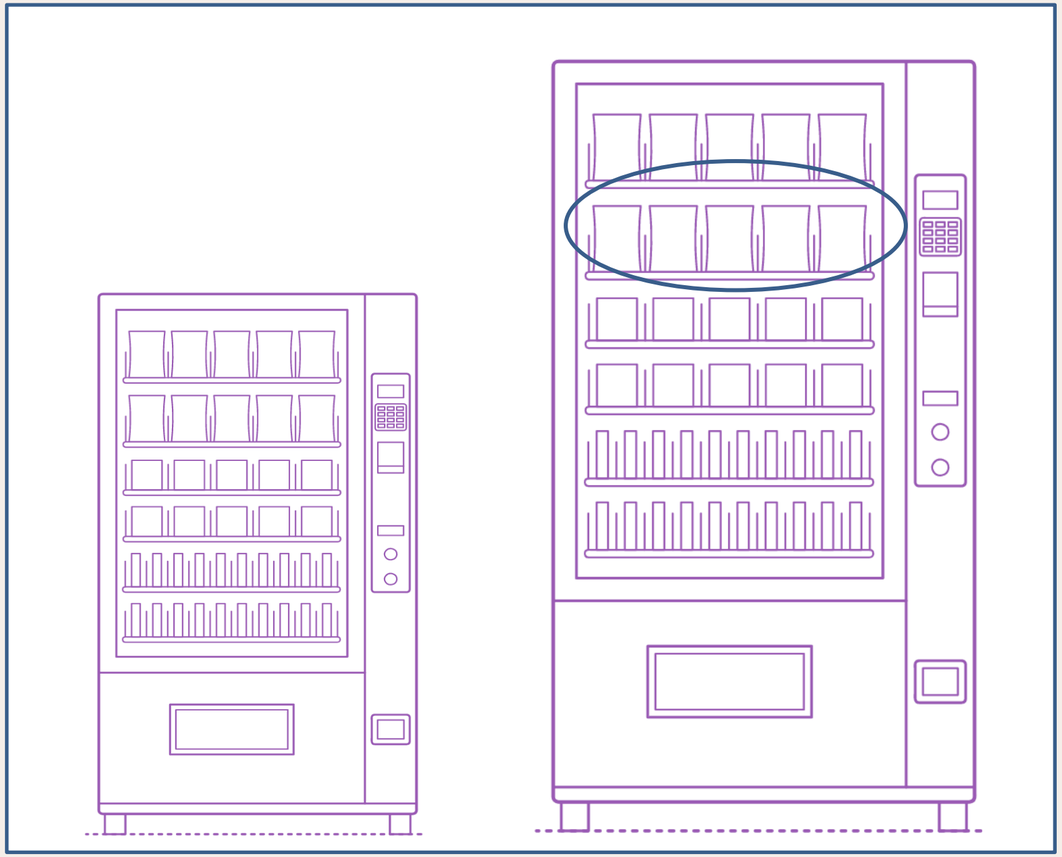
SMALL MACHINE: 49 SLOTS

The items placed at the eye level translate into 35% more attention than other products.*

ASSUMPTION

Products were previously randomly placed inside a machine.

Small and big machines most attention-grabbing rows



*Lihua, G. P. (2018, mai 15). Eye level is buy level — The Principles of Visual Merchandising (and Shelf Placement). Consulté le 25 mars 2020, à l'adresse https://medium.com/@giaphualihua/eye-level-is-buy-level-the-principles-of-visual-merchandising-and-shelf-placement-5f2fd8f7f298

LEVER 2: ASSORTMENT

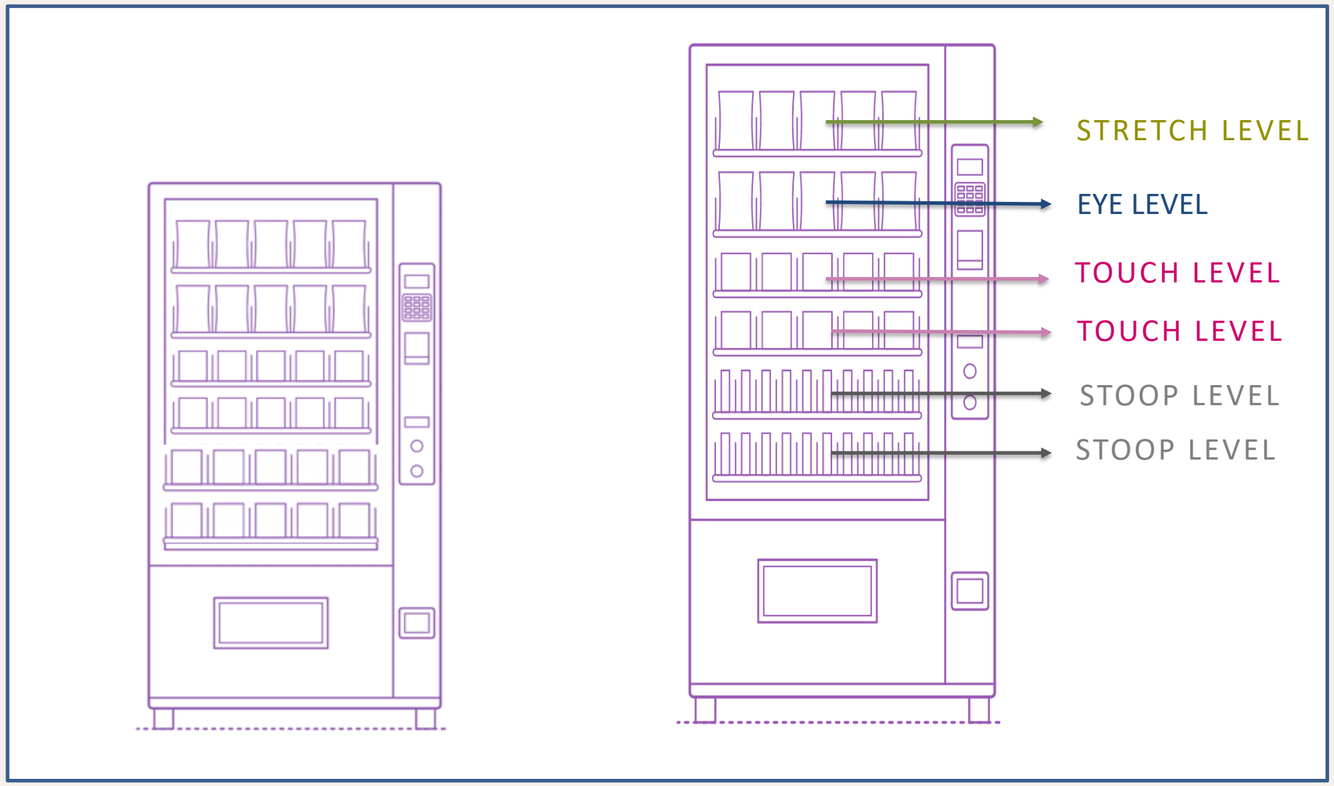
We created a list of the highest performing products and placed them inside the machine, based on a visual merchandizing concept. The products with the highest performance were placed at eye level, in the middle, etc.*

EYE LEVEL:
Sugar_confectionary_incl_gums_1
Unflavoured_carbonates_1
...

STRETCH LEVEL:
Tea_and_coffee_based_2
Crisps_2
...

TOUCH LEVEL:
Chocolate_based_6
Bakery_and_pastries_5
...

STOOP LEVEL:
Unflavoured_carbonates_3
Salty_excl_crisps_2
...



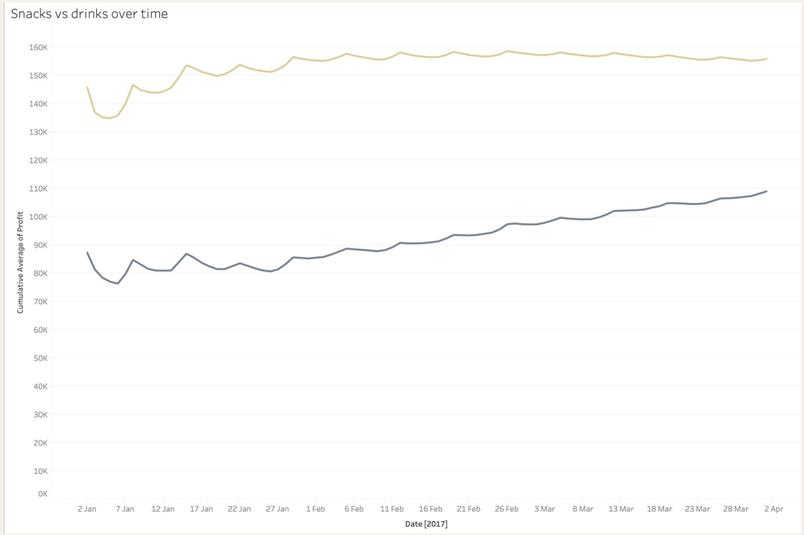
PROFIT INCREASE BY 10%

* Dopez la productivité de vos DA Snack grâce au merchandising. (2014, septembre 12). Consulté le 25 mars 2020, à l'adresse https://www.da-mag.com/dopez-la-productivite-de-vos-da-snack-grace-au-merchandising/

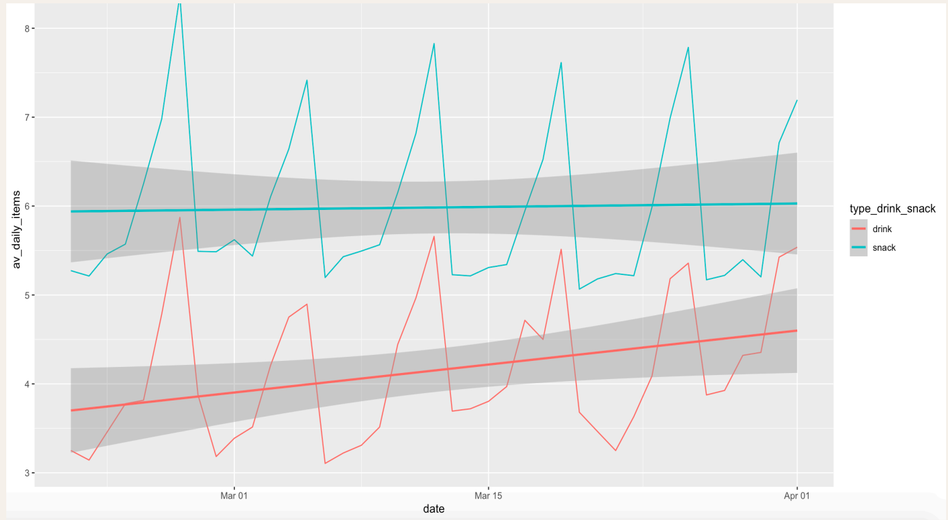
LEVER 2: ASSORTMENT

2.2. Seasonability: *We identified that the assortment is subject to seasonability changes, thus it will be adjusted according to this* ***trend's demand***.

Snacks and drinks profit from January to March



Snacks and drinks sales in March



The drinks profit from January to March shows an increase trend, while the snacks profit remains stable.

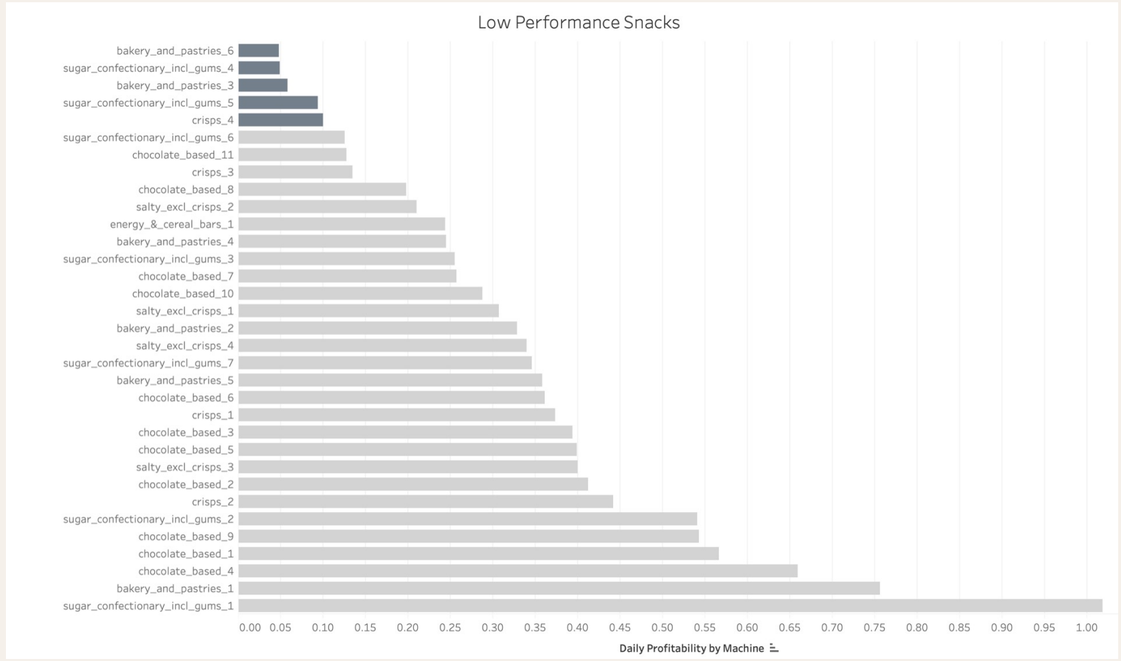
The seasonability trend starts at the beginning of March, therefore the replacement will take place then.

PROFIT INCREASE BY 3-7%

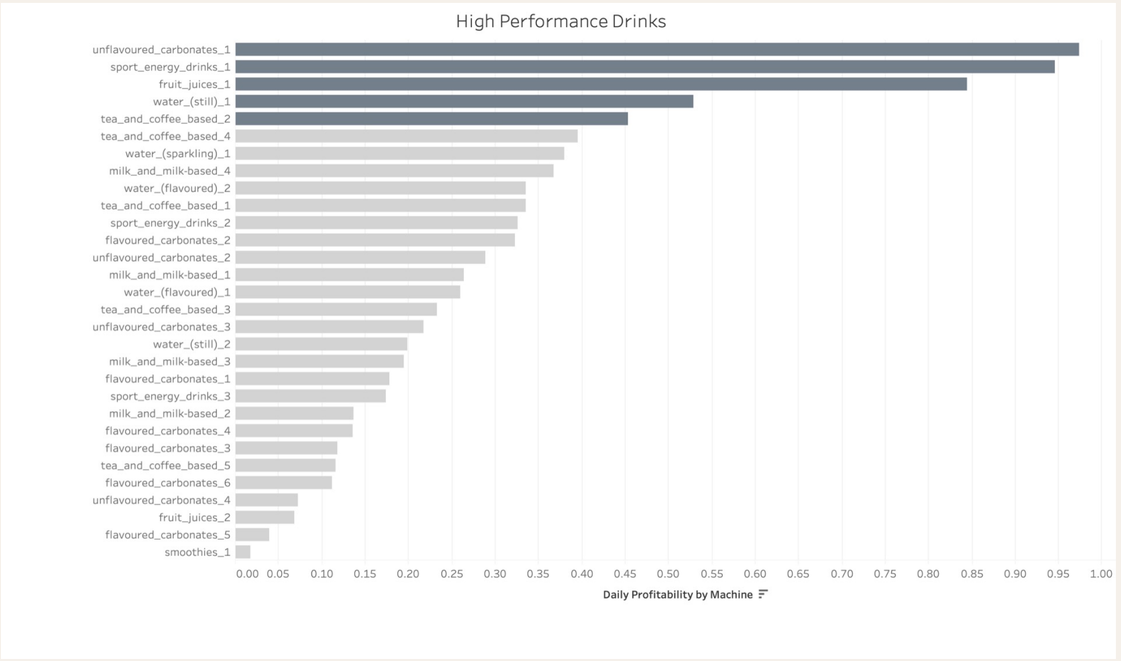
LEVER 2: ASSORTMENT

Following these trends, we created seasonability replacement list: we identified the average high-performance drinks and low-performance snacks to swap them at the beginning of March.

Low performance snacks

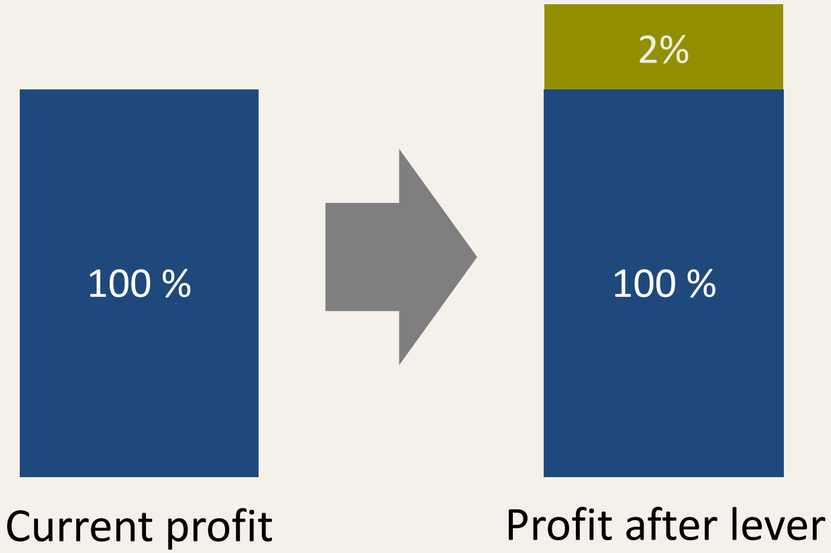


High performance drinks



Since these performance lists are based on an average machine, we cannot assure this replacement will be successful in each individual machine and/or location. Therefore, the approach will follow an A/B Testing to measure the performance and identify patterns for further decision makings.

LEVER 3: PRODUCT BUNDLING



LEVER 3: PRODUCT BUNDLING

We paired top profit product items with low profit ones, creating menus to increase the performance of the latter.

Timeframe performance examples

15:00 to 16:00

	Product	X	Freg	pps
43	Sugar confectionary incl gums 1	17512.2	7614	2.3
7	Chocolate based 1	8837.4	6798	1.3
29	Fruit juices 1	11952.0	5976	2.0
10	Chocolate based 2	6206.2	5642	1.1
11	Chocolate based 3	6458.4	4968	1.3
44	Sugar confectionary incl gums 2	9292.9	4891	1.9
40	Sport energy drinks 1	11196.4	4868	2.3
12	Chocolate based 4	10587.5	4235	2.5
50	Tea and coffee based 1	4676.4	3897	1.2
55	Unflavoured carbonates 1	8247.2	3172	2.6

22:00 to 23:00

	Product	X	Freg	pps
43	sugar_confectionary_incl_gums_1	19214.2	8354	2.3
7	chocolate_based_1	10028.2	7714	1.3
40	sport_energy_drinks_1	17077.5	7425	2.3
29	fruit_juices_1	14696.0	7348	2.0
10	chocolate_based_2	6774.9	6159	1.1
50	tea_and_coffee_based_1	7387.2	6156	1.2
12	chocolate_based_4	14277.5	5711	2.5
44	sugar_confectionary_incl_gums_2	10187.8	5362	1.9
55	unflavoured_carbonates_1	13800.8	5308	2.6
1	bakery_and_pastries_1	14761.0	5090	2.9

We analyzed the product performance from the current data based on timeframes (15:00 to 16:00 and 22: to 23:00) for the average machine (independently of their size or location).

LEVER 3: PRODUCT BUNDLING

We created menus comprising snack + drink menus based on the busiest hours, using a high profit product as leverage for a low profit one.

ASSUMPTION

10% of current sales of the products will become the demand for the bundle. We provide a 10% discount on bundle price.

First product – used as leverage

	Product	X	Freg	pps
43	Sugar confectionary incl gums 1	17512.2	7614	2.3
7	Chocolate based 1	8837.4	**6798**	**1.3**
29	Fruit juices 1	11952.0	5976	2.0
10	Chocolate based 2	6206.2	5642	1.1
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Second Product- liked product with high-margin

	Product	X	Freg	pps
35	salty_excl_crisps_1	3806.4	3172	1.2
45	sugar_confectionary_incl_gums_3	5470.2	3039	1.8
18	crisps_1	4838.4	3024	1.6
13	chocolate_based_5	5932.0	2966	2.0
14	chocolate_based_6	5622.1	2959	1.9
15	chocolate_based_7	4110.4	2936	1.4
1	bakery_and_pastries_1	7763.3	2677	2.9
19	crips_2	6415.2	2673	2.4
16	chocolate_based_8	3151.2	2424	1.3
2	bakery_and_pastries_2	4594.0	2297	2.0

We used the high-selling low-margin products to increase demand for lower-selling high-margin products to drive a greater increase in profit

LEVER 3: PRODUCT BUNDLING

Solution’s impact on profit

TIMEFRAME	TYPE	PRODUCT BUNDLED	IMPACT
9:00-10:00	Morning Menu	1. Chocolate_based_1 2. Bakery_and_pastries_1	11.57%
15:00-16:00	Lunch Menu	1. Chocolate_based_1 2. Salty_excl_crisps_4	12.75%
22:00 – 23:00	Night Menu	1. Sugar_confectionary_incl_gums_1 2. Sport_energy_drinks_1	8.00%

All 24 timeframes have been analyzed. Bundled product choice is based on maximum absolute profit, not % increase over old combined profit.

OVERALL PROFIT INCREASE BY 2%

SUMMARY AND IMPACT

OPTIMIZATION LEVER	LEVER DESCRIPTION	PROFIT INCREASE
LOCATION	Location-based performance and swap analysis	5.25%
ASSORTMENT	Product selection and position based on seasonability	10%
PRODUCT BUNDLING	Bundle products with high sales correlation to exploit demand	3-7%
		2%
TOTAL		**20.25 – 27-25%**

FUTURE LEVERS

The next steps to take to optimize operations and increase profits, will involve the next levers:

Optimized restocking using an alarm system

Restocking

Analyse machine's condition and requirements with an early-warning alarm system.

Maintainance

Implement cashless payment options in every machine* to increase profit.

Cashless

*https://www.cr80news.com/news-item/study-finds-cashless-vending-machines-outperform-cash-only-counterparts/

THANK YOU!

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