Complexity Analysis of Factors and Equipment

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OVERVIEW

Problem: Baristas can feel overwhelmed due to complex beverage recipes or equipment.

Goal: Provide Starbucks with a methodology to factor complexity into R&D decisions.

Outputs

- **Complexity Score:** % chance a beverage will be ranked more complex than another
- **Ranking of equipment complexity**

Financial Impact	Yearly Magnitude*
R&D Costs	$30M
Turnover Costs	$120M

$4,000,000/yr* Potentially Saved

*Due to the proprietary nature of Starbucks' financials, the true values have been multiplied by a scalar between 0 to 1

Current State

- Barista pain points
- Unknown Complexity Indicators
- Overwhelming training period

Future State

- Unburdened baristas
- Quantified Complexity Indicators
- Streamlined training period

Survey Analysis A

Goal: Identify and rank factors in Starbucks beverage recipes based on their difficulty in use

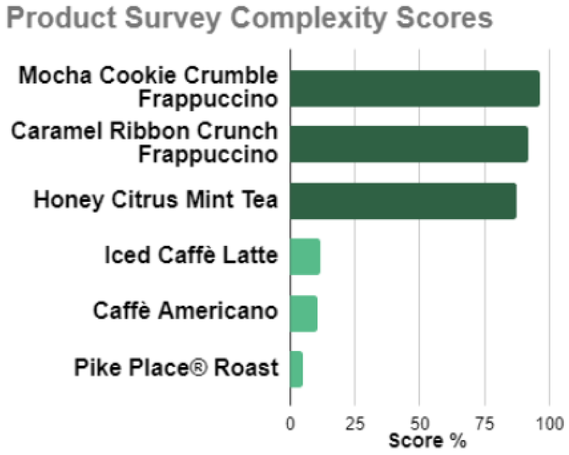
Method: Survey baristas to attain a ranked list of 20 beverages, then analyze different factors to observe their impact on rankings

DATA COLLECTION

- Survey
- Factor Compilation

DATA ANALYSIS

- ANOVA
- Pairwise Factor Analysis



Variance Analysis B

Goal: Explore the relationship between production time variance and drink complexity

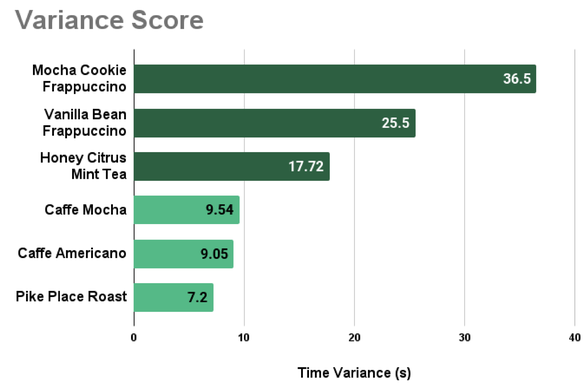
Assumption: Larger variance means higher chance of complexity in the process

DATA COLLECTION

- TAMS Database

DATA ANALYSIS

- Data Cleaning
- Pivot Table & Chart



Learnability Analysis C

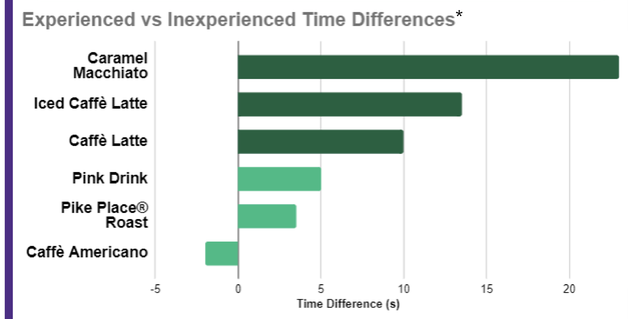
Goal: Ranking Starbucks equipment based on their difficulty to learn

DATA COLLECTION

- TAMS Database
- Tryer Center Testing

DATA ANALYSIS

- Inexperienced Barista Cycle Time Testing
- TAMS Database Comparisons
- Equipment List Creation
- ANOVA With Equipment Factors



*Frappuccinos & teas were unable to be tested due to equipment constraints

Analysis

Complexity Ranking Predictors

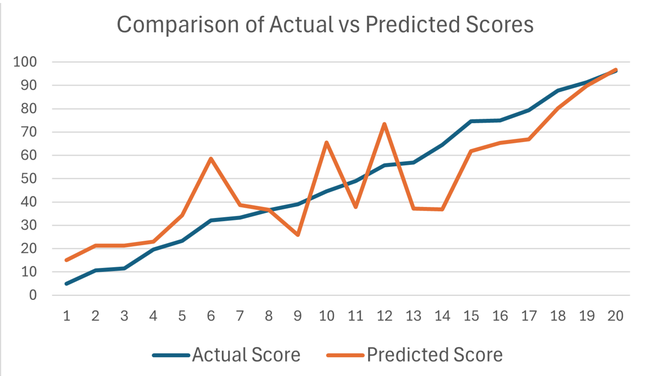
Factor	Kendall Coef.
Step Count	0.66
Variance	0.69
Learnability*	0.35

*The Learnability route was constrained by the equipment available for testing, resulting in fewer data points. Further analysis required

Complexity Score = $\beta_0 + \beta_1(SC) + \beta_2(VAR)$

β_0 , β_1 , β_2 = Coefficient Scalars
SC = Step Count
VAR = Variance

Equipment Complexity Rankings
Our routes produced consistent significant factors of complexity in terms of equipment



Complex	Simple
1- Frappuccino Blender	1- Mastrena 2 Shots
2- Shaker	2- Clover Vertica
3- Syrup Pump	3- Caramel Drizzle

Recommendations

1- Expanding Data Collection:
Larger study sizes allow for more accurate analysis methods. Regularly updated data increases relevance

2- Continuous Tracking System:
Implementing real-time tracking of drink preparation times

3- Versatile Framework:
Our methodologies are applicable to various tasks beyond beverage production, such as food and preparation processes