



SINTENO AI:: REDEFINING CONSUMER INSIGHTS AND PRODUCT SUCCESS

by YieldWise Inc.

UNCOVERING CONSUMER INSIGHTS IS CHALLENGING

To **grow revenue and remain competitive**, your business needs to know **what consumers think** and **feel**.

But **uncovering insights** into consumer preferences and motivations **is difficult**.



SURVEYS ARE EXPERIMENTS

Taken at face value, **survey responses only tell part of the story.**

- Answers to survey questions shape **consumer insights**
- How we ask the questions **impacts the answers** we get
- How we analyze the answers **influences the validity** of the results



SURVEY DATA ANALYSIS IS FLAWED

Survey responses are almost always *wrongly analyzed*, resulting in *misleading conclusions* ¹

- Survey responses have a **logical order or ranking** - so they **can not be averaged or summed**
- The **difficulty of survey questions** varies among questions
- The **ability of survey respondents** varies among respondents
- **Dependencies** exist among survey questions

¹ Liddell, T. M., & Kruschke, J. K. (2018). Analyzing ordinal data with metric models: What could possibly go wrong? *Journal of Experimental Social Psychology*, 79, 328-348.

SURVEY DATA CAN'T BE AVERAGED

Example.

Survey responses **may be coded as numbers**

Very Unsatisfied = 1, Unsatisfied = 2, Neutral = 3, Satisfied = 4, Very Satisfied = 5

But these **codes only look like numbers** and **must remain ordered categories**:

- 1. Intervals between adjacent categories may not be equal*
- 2. Patterns of intervals between adjacent categories vary from question to question*

Question 1	VU	U	N	S	VS
Question 2	VU	U	N	S	VS
Question 3	VU	U	N	S	VS



Question 1	1	2	3	4	5
Question 2	1	2	3	4	5
Question 3	1	2	3	4	5



A SOLUTION UNLIKE ANY OTHER ON THE MARKET

Survey analysis must go beyond basic and flawed response analysis to consider **difficulty of the questions** and **ability of the respondents**.

And that requires **SINTENO::AI**.



SINTENO::AI SOLUTION

SINTENO applies AI and proprietary algorithms to go beyond basic survey analysis by:

1. **Converting** survey responses to probabilities
2. Simultaneously **estimating the difficulty of** survey questions and **the ability of respondents**
3. Identifying and **eliminating malfunctioning questions**
4. **Identifying** and removing **untrustworthy responses**
5. **Establishing causal relations** among survey questions and key (foundational) questions identified.



CONSUMER AND PRODUCT SUCCESS PROFILE

SINTENO creates a **Consumer and Product Success Profile** by identifying the **foundational product attributes** that align with **consumer preferences**, ensuring that the product **meets consumer needs** now and in the future.

The lowest rating that is expected by a consumer who exhibits a positive attitude. This is important because it varies for each question/attribute.

Foundational Questions

#	Attribute	Difficulty	Rank	Attribute Importance
1	On Display in Store	-5.10	5	Foundational
2	Product Quality	-3.45	4	
3	Product Brand	-1.91	4	
4	TV Promotions	0.70	3	
5	Product Price	2.66	2	Foundational
6	Product Features	7.10	2	Foundational

Typically, on a five-point scale, a 4 or a 5 would be considered good, but here SINTENO shows anything less than a 5 would no longer be in positive territory.

Conversely, the rank of 2 on Product Price here might normally be considered negative. But here SINTENO shows it is “good enough” for the product success.



CONSUMER PREFERENCES CARDS

By analyzing consumer preferences, SINTENO **generates recommendations** for enhancing the product or service, ultimately contributing to its success.

Preference Card for Consumer PID003, Preference 1.35, Unsatisfied

Question	Actual Rank	Prob. Choosing Rank 1	Prob. Choosing Rank 2	Prob. Choosing Rank 3	Prob. Choosing Rank 4	Prob. Choosing Rank 5	Most Likely Rank	Consumer & Product Profile	Degree of Satisfaction
On display in store	4	0.00	0.00	0.01	0.22	0.78	5	5	Unsatisfied
Product brand	3	0.00	0.00	0.32	0.59	0.09	4	4	Unsatisfied
Product features	1	0.26	0.74	0.01	0.00	0.00	2	2	Unsatisfied
Product price	4	0.00	0.57	0.42	0.01	0.00	2	2	Satisfied
Product quality	5	0.00	0.00	0.06	0.55	0.38	4	4	Satisfied
TV promotions	3	0.00	0.15	0.75	0.10	0.00	3	3	Satisfied



BENEFITS OF SINTENO

Boost revenue and outpace the competition by:

- Providing **real and trustworthy** insights into **consumer opinions, preferences, and motivations** related to product/service attributes and advertising
- Identifying **crucial product attributes** and aligning them with consumer preferences
- Providing **actionable recommendations** to improve product and advertising
- Preventing **costly errors** in product and advertising decisions
- Aiding in the **refinement of the future surveys** for maximum efficiency



ABOUT US

- YieldWise is a **leading provider of innovative analytical solutions** specializing in the research and development of **sophisticated analytical methods** and software tools for various applications such as **demand forecasting**, design of experiments, **survey analysis**, statistical quality control, **survival analysis**, time series analysis and forecasting, computer and network performance evaluation and capacity planning, **statistical and machine-learning consulting** and training
- YieldWise Inc., has developed an analytical platform that supports applications like SINTENO. The YieldWise application suite also includes:
 - A-SCALA: focuses on redefining student success**
 - EXOUSIA: focuses on redefining employee success**



APPENDIX

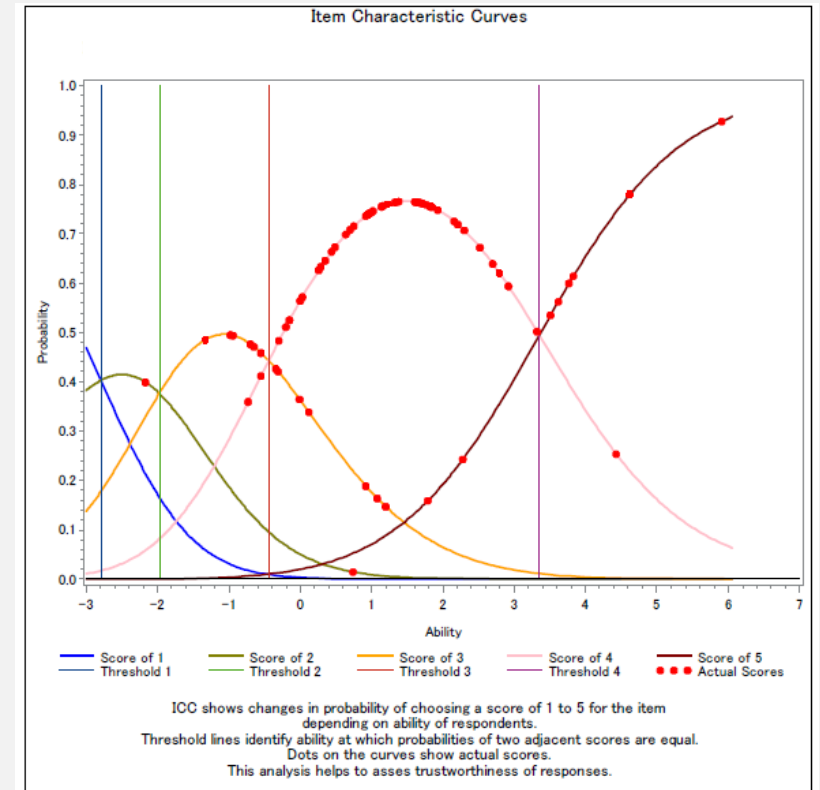
CREATING FAIR AND EFFECTIVE ASSESSMENTS



Georg Rasch
Danish Mathematician
and Psychometrician

Applying the Rasch Model

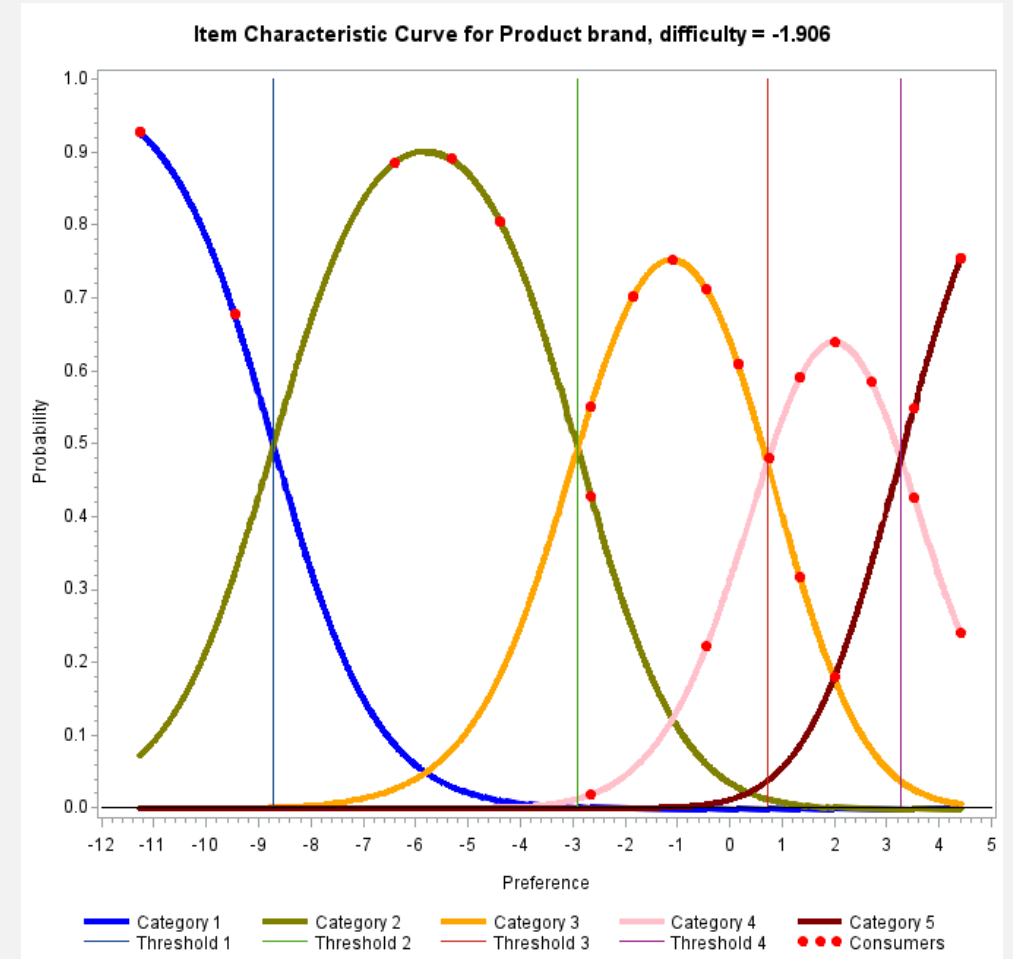
- A psychometric model that estimates questions difficulty and respondents' ability by looking at the totality of the responses and examining the probability of answering one way or another.
- Originally used in academia, we've adapted it for use in marketing.



ASSESSING TRUSTWORTHINESS OF RESPONSES

Item Characteristic Curve (ICC)

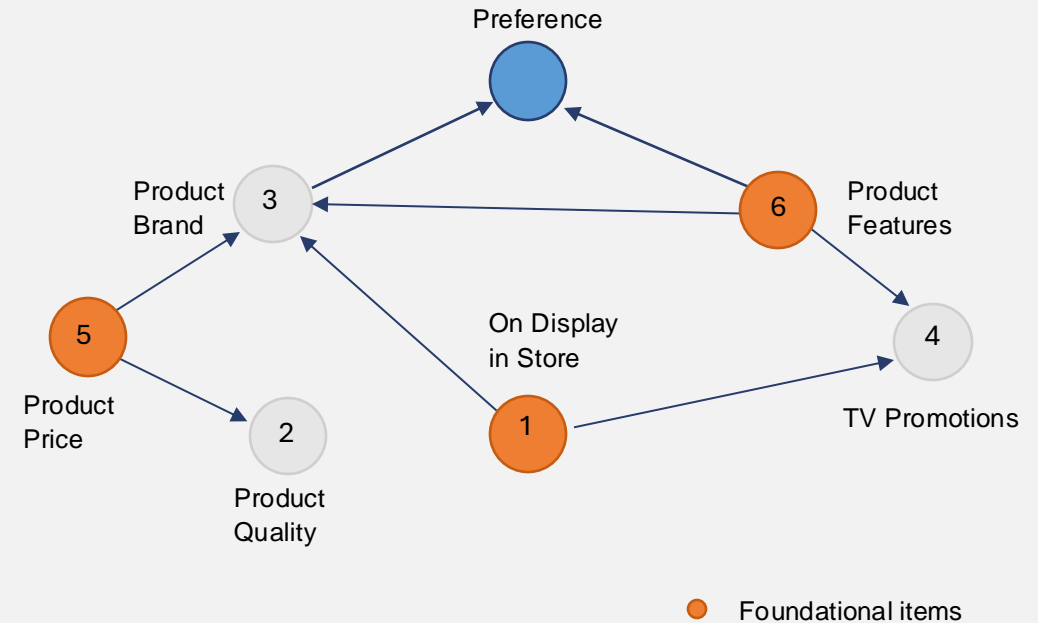
ICC shows the probability distributions to choose a rank or category that is in line with respondent ability and question difficulty.



SOME ATTRIBUTES ARE MORE IMPORTANT THAN OTHERS

Relational Bayesian Networks

Understanding the causal relationships among questions helps identify which product attributes (presented as survey questions) consumers prioritize when deciding whether or not to purchase.

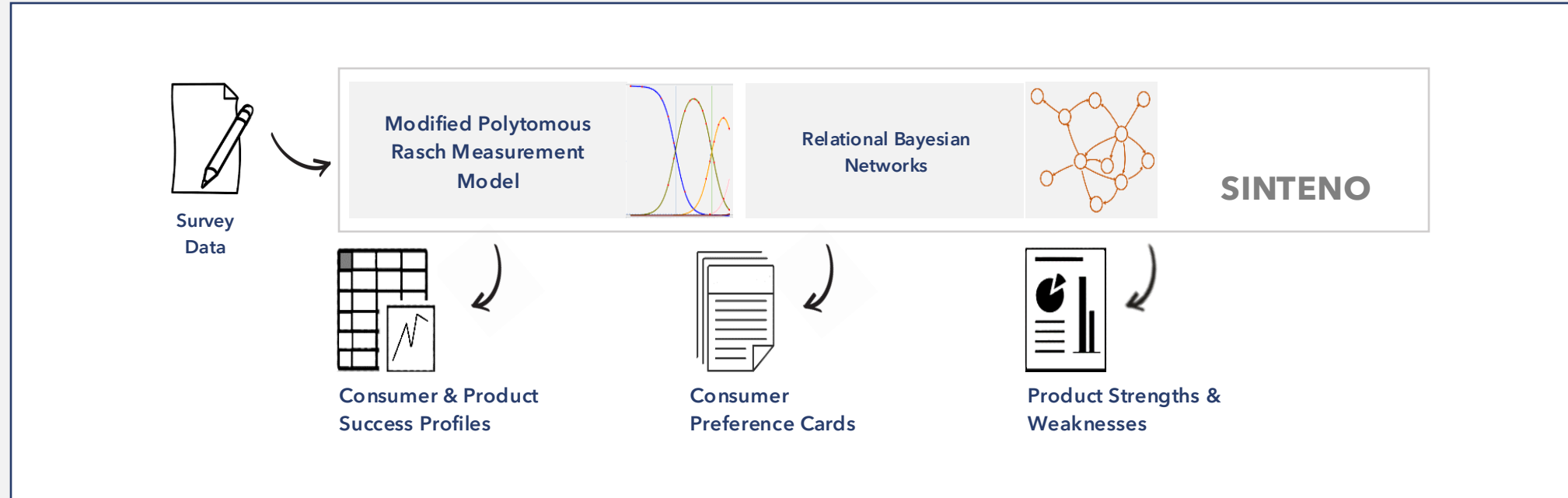


In this example, the three foundational attributes of the product and its advertising are:

- “On Display in Store”
- “Product Price”
- “Product Features”



SINTENO AI/ML Input, Processing, Output



By conducting a **series of short consecutive surveys**, SINTENO can **accurately** identify consumer preferences and product strengths and weaknesses, **eliminating the bias** of sample under-representation. This process creates a **Consumer and Product Success Profile** that quantifies the **impact of foundational items on consumer preferences**.



TAKING INTO ACCOUNT ABILITY OF RESPONDENTS AND DIFFICULTY OF QUESTIONS

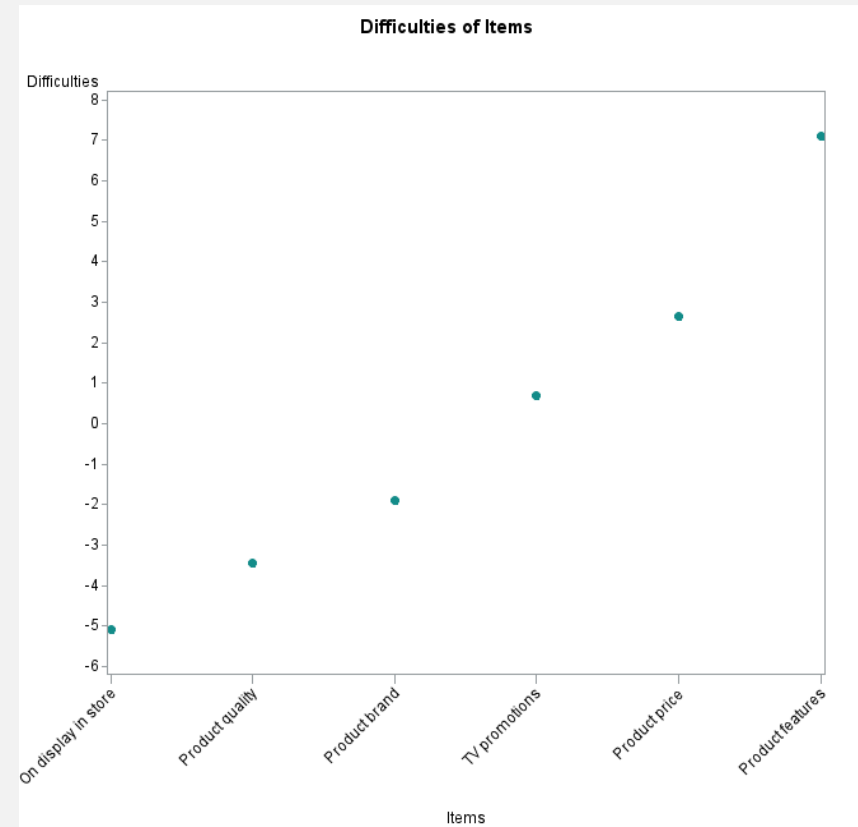
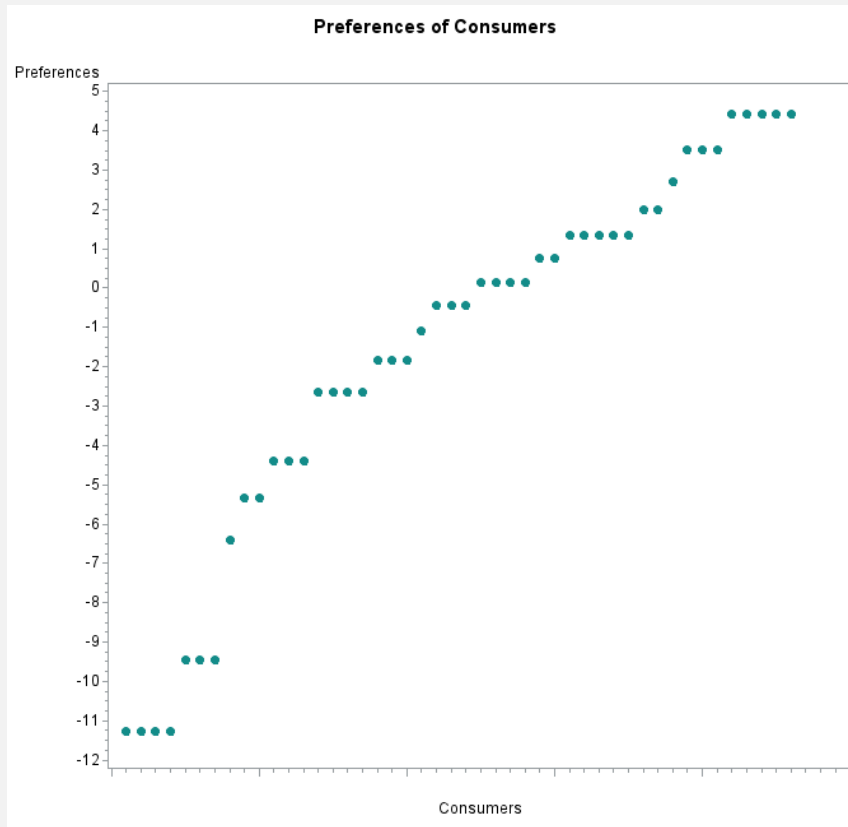
Respondents \ Questions	Questions					
	Question 1	Question 2	Question 3	Question 4	Question 5	
Respondent 1	2	1	1	2	1	
Respondent 2	2	2	4	2	1	
Respondent 3	5	3	3	3	1	Ability of Respondent 3
Respondent 4	5	3	3	4	1	
...	
Respondent N	5	3	4	5	2	
			Difficulty of Question 3			

Ability is respondent property (or characteristic), and difficulty is question property. Sinteno's modified Polytomous Rasch Measurement Model helps to estimate these properties.



ABILITY AND DIFFICULTY ILLUSTRATED

These graphs reflect the **quality of the audience** and the **survey questions**. The desired quality of the audience and the survey questions are indicated by the ability and difficulty clustered in horizontal lines.

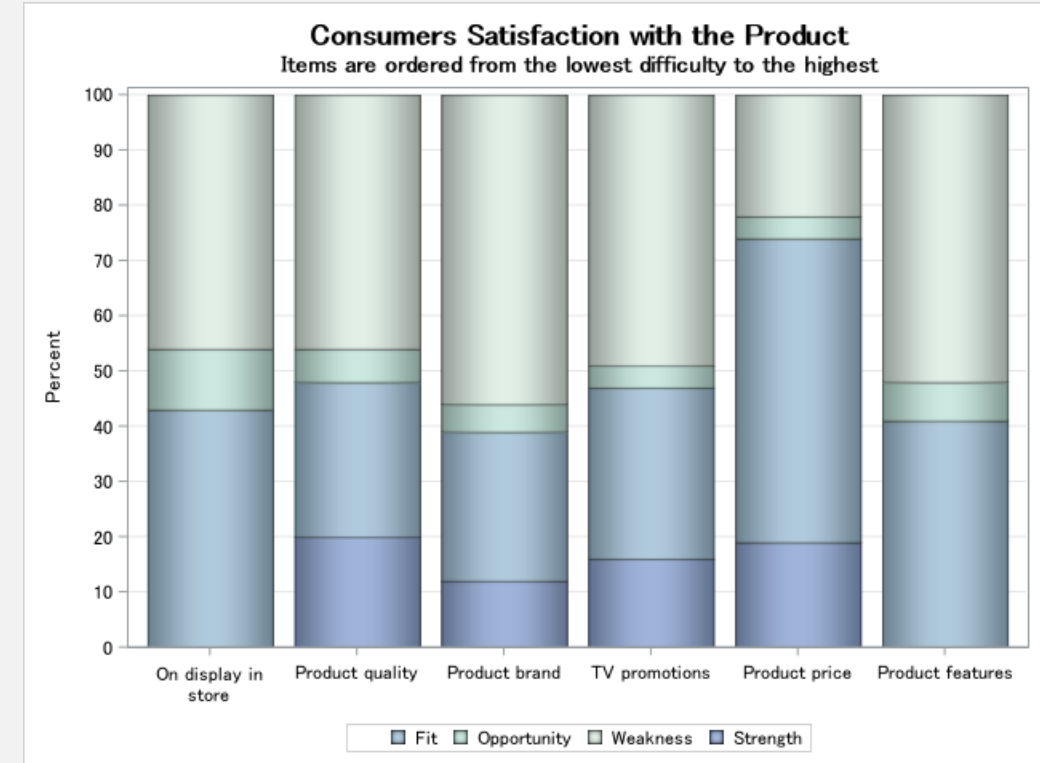


CONSUMER SATISFACTION WITH THE PRODUCT

SINTENO estimates consumer satisfaction using a Consumer and Product Success Profile.

- **Strength:** the rank (or category) that is expected to be chosen by the respondent for an item (question) is higher than its rank in the Success Profile.
- **Fit:** the expected rank is the same as the rank in the Profile.
- **Weakness:** the expected rank is significantly lower than the rank defined by the Profile.

For example: the “Product Features” item has about 40% of respondents that are in the Fit group, while the “Product Price” item has about 78% of respondents that are in the Strength and Fit groups.



VALIDATION FROM ACADEMIA

Methodology Presented to Acclaim at Multiple Analytics Conferences Across Industries:

1. Academy of Market Research Conference, Stirling University, Scotland (2018)
2. ISMS Marketing Science Conference, Rome University, Italy (2019)
3. IAEA2019 Conference, Baku, Azerbaijan (2019)
4. 20th Annual Conference AEA Europe, IAVE, Lisbon, Portugal (2019)
5. Nashville Analytics Summit, OMNI Center, USA (2021)

Sample Reaction from Colleagues

“It is mathematical statistics at its best, showing how accurate processing of raw survey data yields valuable conclusions ... It is definitely a major improvement compared to the simple average scores that we usually provide ... It is surely a major step forward.”

Prof. Xavier Giménez, Departament de Ciència de Materials i Química Física & Institut de Química Teòrica i Computacional (IQTUB), Universitat de Barcelona, Spain



THE SINTENO METHOD

IDENTIFY

Malfunctioning survey items and not trustworthy responses

Items' Difficulty and Respondents' ability

Foundational Items

GENERATE

Causal relations among survey items

Consumer Preference Cards

DELIVER

Consumer & Product Success Profiles

Product Strength and Weaknesses

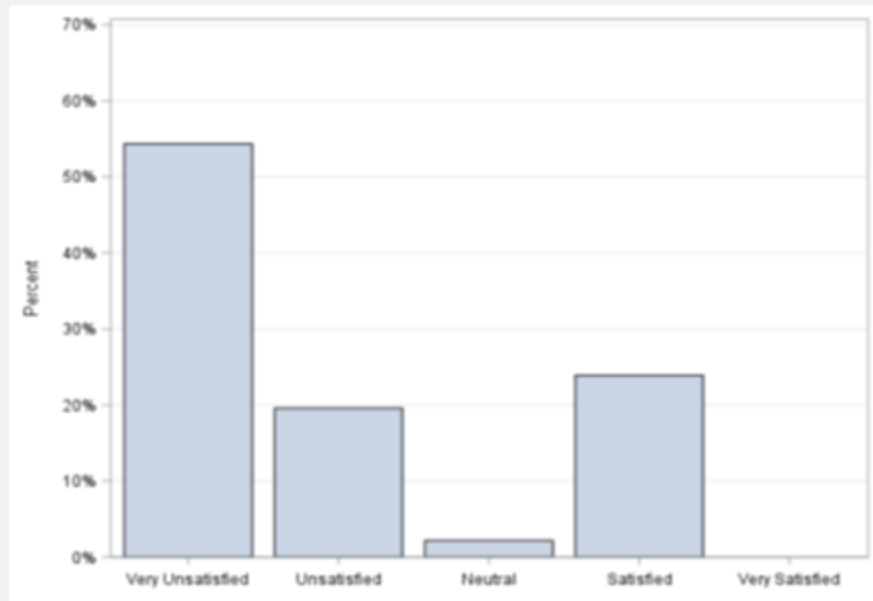


EXAMPLE: CONSUMER SATISFACTION

Analysis of Survey Raw Scores

SINTENO Results

- **2.1%** of consumers have **Neutral** attitude,
- **54.4%** of consumers are **Very Unsatisfied** with the product.



Score Averaging Results

- **39.1%** of consumers have **Neutral** attitude,
- **15.2%** of consumers are **Very Unsatisfied** with the product.

