Configurator Analysis™ and Price Sensitivity using Modified van Westendorp Procedure
CONFIGURATOR ANALYSIS™ AND PRICE SENSITIVITY USING MODIFIED VAN WESTENDORP PROCEDURE

Background

Socratic Technologies’ Configurator Analysis (CA™) is an online process that allows research participants to create their own ideal product or service bundles. Choosing among possible combinations of features and service components, people “configure” products that will most closely match their needs and expectations. In some cases, known subcomponent pricing is used to closely mimic the real-life shopping experience in which specific features add cost to a base model.

In other instances, component prices are either unknown or hard to assign on a component-level basis. In these cases, an additional step is added to the “configuration” process in order to assess the price expectations of the fully-defined product or service. This price-assessment step, which is the second focus of this white paper, is a modified form of van Westendorp Price Sensitivity Meter (PSM) modeling.

Methodology

Configurator Analysis is a proprietary data collection and analysis technique, first introduced by Socratic Technologies in 1999. It is designed to gain a deep understanding of the value relationship between the discrete components of products and services, as well as aid in establishing efficient pricing structures.

• Interactive technologies allow users to build their own ideal products
• Each added feature can be accompanied by a predetermined cost
• Modified van Westendorp technique pairs features chosen with price expectations——allowing for more accurate data on how much value customers associate with specific product configurations
• Users indicate preferred product or service features, as well as their likelihood to purchase the particular product/service

Description

While similar to a traditional Conjoint, Discrete Choice or other choice-based analysis studies, Configurator Analysis is more effective due to the more realistic feature combination process that users use to create their ideal products. Specifically, Configurator Analysis was designed to overcome some of the known problems with standard Conjoint procedures.

Conjoint

• Restricted number of features that can be tested
• Predetermined configuration sets may not be realistic
• Predetermined price not driven by features or sensitivity algorithms
• Does not handle complex combinations well

1Throughout this paper, the generic term “product” is intended to encompass products, services and transactions, all of which may be modeled using Configurator Analysis and van Westendorp PSM technique.
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Configurator Analysis
- Can handle many features and requirements
- Choices offered are governed by features that are actually designed to be compatible with one another
- Rule-based pricing can be used to reflect specific features chosen
- Socratic’s Smart Pricing Meter™ produces demand curves and revenue maximization predictions

Execution
In general, we suggest the use of Configurator Analysis when:
- The number of features or levels to be tested would be too cumbersome using other decision-modeling strategies
- There are constraints that govern how the features can be combined
- The range of acceptable pricing is unknown or differs greatly by segment of customer

Figure 1: A laptop computer is the product under study in this engaging online survey that is a part of the Configurator Analysis methodology.
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Feature Factors

The application of the Configurator Analysis procedure begins with a Factor Analysis, which identifies latent classes of features: those that tend to be considered together as a part of a larger theme [Figure 2]. An example of a Feature Factor would include product or service characteristics that would be logically considered together to produce a high-order benefit. For instance, seat belts, child door locks, frost warning alarms, etc., might all be considered components of a “safety benefit” factor for an automobile.

Feature Factors can be used to reveal the degree to which features influence the purchase decision of various individuals. By reducing the overall number of individual features into a factor (also known as a data reduction procedure), the complexity of the influences on decisions can be more easily interpreted. The degree to which each feature is associated with a factor is measured by a “factor loading score.”

Each factor explains a certain proportion of the variance in the answers given by respondents who have configured products. When all the factors are taken together, the higher the variance explained, the better the model. When models explain more than 75% of the total variance, it is generally considered to be quite good.

The chart in the next column illustrates how 33 automotive attributes are distilled into just seven factors or main themes.
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Product Feature Mapping
Factors can also be used to “dimensionalize” the product decision market. Socratic’s Product and Feature Market Map [Figure 3] shows how the factors are related to one another. In the diagram, factor arrows that point in the same direction tend to have similar influences.

Arrows that point in opposite directions reveal influences that will affect people’s decisions in very different ways. For example, the “Prestige” factor lies exactly opposite the “Bargain” factor. We interpret this to mean that people who would be highly motivated by features in a “Prestige” factor would be unlikely to be motivated by features in the “Bargain” factor.

Using this basic product market map, we next identify groups (or clusters) of people with similar tastes and demands for the product being configured. These sub-groups are identified according to the key common choices that differentiate them significantly from other groups in the test. Once again, the arrows help to define the various groups’ affinity for certain types of feature sets. The closer a cluster is located to the end of a factor arrow, the more its demand is governed by that factor. If a cluster lies opposite a factor arrow, those people are likely not motivated by features in that factor.

The relative size and demographic/firmographic characteristics of each group can be profiled.

In the next section, we will discuss how the preferred product configurations expressed by these groups are then modeled for price sensitivity and “deal proneness” for the desired product at any specific price point (using Socratic’s modified van Westendorp price procedure).

Figure 3: Product and Feature Market Map
Modified van Westendorp Pricing

Background

The van Westendorp Price Sensitivity Meter was developed in the 1970s by Dutch economist Peter H. van Westendorp to examine patterns of price consciousness. His method includes four questions related to each respondent’s expectation for a product’s price. Rather than use a direct approach, such as asking, “How much would you pay for this product?” (a technique that has been shown to be quite unreliable), the van Westendorp approach is to “surround the market price” by asking four price-value relational questions.

Traditional van Westendorp Order

• At what price would you consider this product to be a bargain—a great value for the money?
• At what price would it start to get expensive, but still worth considering?
• At what price would it be so cheap that quality is doubted?
• At what price is it so expensive that it would not be considered at all?

The theory behind the van Westendorp model, as articulated by Canadian pricing specialist Paul Hunt, rests on two psychological precepts:

Theory of Reasonable Prices, which assumes buyers can examine an item and formulate a rough notion of what they would expect the item to cost, or at least the range into which they would expect it to fall.

Price Signaling Quality, which assumes that some prices are “too low,” and that buyers will avoid products that are in this category, fearing poor quality.

At Socratic Technologies, we usually reorder the questions somewhat to allow for a more normal consideration process, building progressively and ranging from “too cheap” to “too expensive.” Socratic’s SmartSlider tool exhibits a modification of the traditional van Westendorp Order [Figure 4].

Socratic’s Modified van Westendorp Order

S1. At what price would it be so cheap that quality is doubted?

S2. At what price would you consider this product to be a bargain—a great value for the money?

S3. At what price would it start getting expensive, but still worth considering?

S4. At what price is it so expensive that it would not be considered at all?

In some cases, the respondent’s ability to answer these questions from a standpoint of reasonable expectations is hampered by lack of familiarity with pricing for the product category in general. Therefore, we recommend giving a range of competitive prices as they exist (or may exist) in the market.

This also allows us to utilize a “smart pricing slider” through which the price point set at one “price event” becomes the lower bound for the next. Real-time error checking is used to create “bounding logic” to make sure the answers are in the correct ordinal position. For example, “too cheap” (S1) must be lower than “bargain” (S2), and “too expensive” (S4) must be higher than “would still consider” (S3).
Validation

The use of van Westendorp PSM exercises to determine the market value of products, services and market intangibles (such as brand) have been documented and validated in many cases ranging from consumer products to NASA studies for the Kennedy Space Center.

Socratic Technologies has completed more than 100 studies in which some form of price validation (either using market data or convergent findings from other related studies) was obtained. The key finding from these and many other validation studies is that the van Westendorp method, when properly implemented, produces results that are very similar to real-world, verifiable pricing and demand-share data.

Many other companies have published findings similar to our own. Energy Market Services, for example, has published a case study in which a product configuration (for a commercial surge protector) was followed by a van Westendorp PSM exercise. They found that the van Westendorp approach yielded valuable data, which contradicted established company...
perceptions, but which was validated in post-market measurements.

A European study published by Ipsos-Insight used a 100-cell monadic online concept test, in which brand names were varied across eight appliance subcategories. A total of 300 interviews were completed per concept, or approximately 30,000 observations in total. The conclusions from this study were similar to our own. According to the study’s author:

“The van Westendorp pricing methodology was used to predict the prices each brand would command in the marketplace. Comparisons to actual prices revealed a high degree of validity between the prices produced by van Westendorp and actual retail prices. This was true across brands, and across subcategories.”

Analyzing the Results

The van Westendorp technique can be used for both real-time and post-hoc analysis. Real-time analysis is used to generate a purchase-producing price variable during the interview itself at the case level. Post-hoc analysis is used to understand the total market price sensitivity and ideal price ranges for the product in question.

Socratic’s Unique Target Point Calculation

Real-Time Calculation

In real-time analysis, Socratic uses each respondent’s answer to choose a midpoint between the bargain price point and the getting-expensive price point to calculate a price point that must lie in the respondent’s consideration price range. We call this the Unique Target Point (UTP).

Unique Target Point = Midpoint between the individual’s bargain price (S2) and his or her point of “getting expensive” (S3).

As each person responds with a pricing expectation, the UTP is calculated for the individual by taking the midpoint between the price given being “The price at which the item would be starting to get expensive, so that it is not out of the question, but you would have to give some thought to buying it” and “The price at which this item would be such a bargain that you would buy it immediately.” This midpoint calculation is designed to produce a price that always falls into a “reasonable price range” for the participant.

\[
UTP = \frac{([\text{Bargain} + \text{HighConsider}] + [\text{TooHigh}] + [\text{Toolow}] / 2)}{2}
\]

An additional calculation can be used to weigh the UTP by adding the influence of the extreme points (“At what price would it be so expensive that it would not be considered at all?” and “At what price would it be so cheap that quality is doubted?”).

The respondent is then asked to answer a purchase likelihood question for his/her configured product at the unique target price. The likelihood scale used is either a 5-point Likert scale ranging from “5,” meaning, “I definitely would purchase this product,” down to “1,” meaning, “I definitely would not purchase this product”; or it is a 10-point anchored scale with the same endpoint labels.
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Repeated measurements with these follow-up questions have shown that when the configured product is re-presented in full profile form along with the UTP, the resulting purchase intent is extremely high (up to 92% top-two-box purchase intent in some case studies). This verifies that the van Westendorp PSM can be used to detect a price for the individual that is likely to result in a high level of self-reported purchase likelihood.

**Post-Hoc Analysis**

Post-hoc analyses can be done using either the case-level UTP or several other aggregate measures to determine the relevant price range and related demand curves.

**Case-Level Analyses**

Using the case-level UTP measures, Socratic calculates the percentage of people who would be very likely to purchase at price points in the range. This then allows for numerous sensitivity analysis options in which various price points can be tested for either profit or market share goal setting.

In order to project a price-demand curve for the various types of products that people configure, we begin by identifying those people who built similar configurations for themselves. For each major type of product configured, we then sort the UTPs into categorical levels and assess the frequency with which the UTPs occurred. Only those UTPs that had a high probability of purchase (e.g., top-two-box, meaning, the respondent “definitely would” or “probably would” purchase) are counted in this sense, we are creating a market model in which various proportions of the target customers will be willing to purchase the configured product at certain price points.
The Indifference Price Point (IPP) tends to show the average price for the product in a mature market or, if there is a market leader with a predominant share, it can show the average price that manufacturer/producer charges.

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points. At some price point, virtually everyone would be willing to purchase. Of course, this price point may be below production cost and therefore economically infeasible.

The resulting frequency plot shows the number of people who would purchase the product at the various price points generated, as shown in Figure 5.

For this particular product model, we see that the highest demand (100% of UTP fall above this point) is at $6.30. Demand begins to fall sharply after the $10.00 price point, declining to the lowest demand frequency at the $100.00 price point with only 8% of the market still likely to purchase at this point.

For the lower range of prices ($0 to $50) we see that the demand is very elastic (significantly more demand is lost for every dollar of price increase). However, less and less demand is lost for every dollar of price increase above $50, making this portion of the curve rather inelastic.

Revenue Maximization Point

Using the case-level UTP measures (demand curve), Socratic can also determine the theoretical price at which the balance of price point and proportion of people willing to make the deal maximizes the Unitary Revenue Contribution (URC) [Figure 6].

Unitary Revenue Contribution = The mean revenue generated by each individual in the market at each given price point.

In this example we see that at the $40 price point, 56% of the people surveyed would have a high probability of purchase, yielding a URC of $22.40. Since this is
Looking at the distribution of the van Westendorp price ranges can give a clear sense of how the perception of value plays out across the entire sample.

The point at which the URC reaches its maximum, the $40 price point is the one that will maximize revenue for any size of population.

This is the most reliable method for setting an “ideal price” for the product.

**Price Range Statistics**

**Aggregate Analyses**

Socratic uses several other ways of presenting the van Westendorp data to maximize the value of the information content. We begin by presenting the general output from these questions as box plots that capture the range of answers falling into each price category. Letters in the diagram indicate the median price for each question’s response range [Figure 7].

These box plots represent the distribution statistics of the answers as shown in the inset key.

**Reported Weaknesses and Compensating Actions**

**Lack of Information**

Some researchers have reported poor or misleading results using the van Westendorp PSM technique, although they do not appear any more or less.
frequently than with other price-value assessment techniques, such as conjoint analysis or discrete choice analysis. Most of the issues with the van Westendorp procedure are correctable by a few simple steps that are incorporated within our modified van Westendorp procedure.

Another problem associated with the van Westendorp approach is that it may rely on base assumptions that are not very realistic. It assumes, for example, that perfect access to information about all competitive products exists, that perfect competition exists (in which access to and distribution of all products is equal), that no barriers to switching exist and that the unit of measurement is a single purchasing decision (which has neither volume nor other frequency measures associated with it).

In fact, most forms of perception-based pricing techniques make similar assumptions. And while these assumptions may not yield a high degree of verisimilitude, if they are applied equally to all competitive products, the bias stemming from the hypothetical nature of the exercise can be controlled.

In addition, the output from these exercises should be regarded as a “distant early warning system” for products that are shielded from strong competitors by market barriers (e.g., a strong distribution system, long-term contracts, a powerful brand awareness, etc.). Over time, these barriers can be assailed and, barring product value-enhancing development strategies, can leave an original competitor at a disadvantage.

**Need for More Research**

At this time, a number of positive results have been seen using the basic van Westendorp PSM technique. Most of the validation has been related to real-world situations, adding face-validity to the results. However, there still remain a number of issues related to inter-method reliability and the degree to which conjoint and choice-based techniques produce similar and/or corroborating findings. We hope that more research will be performed in this area and that the publication of these findings will contribute to the industry’s use, refinement and customization of the van Westendorp pricing analysis technique.

**Unrealistic Price Expectations**

Some studies have reported that the acceptable price range is either too low or too high to be “reasonable.” Within the context of the exploration, it is assumed that people, when armed with sufficient information about the product, can state what they would consider to be a “reasonable price.” One of the reasons that this doesn’t always work well is that people either have no experience (or infrequent experience) in the category.

Socratic uses a very simple “fix” that can correct the majority of these anomalies. Before beginning the van Westendorp battery, we present the known range (from cheapest to most expensive) for the competitive set in the market sector on which we wish to focus. This helps people who have no recent experience recalibrate their “reasonable expectations” and act
Most of the issues reported in conjunction with van Westendorp technique can be compensated for and avoided through proper setup and pre-evaluation education.

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with “bounded rationality” in their price/value considerations.

Overlapping Product Strata
Another source of error may be that varying levels of the category exist (e.g., home use, office use, industrial use, etc.) and the respondents may focus on an unintended level. This is particularly true when a general product description is used. The best defense against this situation is a very clear description of the product being tested. In the online environment, Socratic makes use of glossaries, illustrations, animations and educational demonstrations designed to thoroughly describe the forms and functions of the product in question. One such tool is our Socratic ProductExhibitor demonstration application.

Socratic ProductExhibitor Description
The Socratic ProductExhibitor provides an excellent way of presenting a product or packaging concept on the Web with the most detailed information possible, yet without overloading the respondent with minutiae. This tool allows the respondent to study aspects of the design, packaging, text and other elements used to communicate the concept or actual product attributes [Figure 8].

Figure 8: Respondents can easily study design and concept aspects with this tool.
Characteristics
The ProductExhibitor provides a platform for scrutiny of a product or package in a standard viewing environment. Rotate, zoom, move and re-position are standard navigation features built into the tool. Glossary entries, pricing and other information can be applied to programmable hot buttons. The tool tracks all movements and time spent in examination, and detects whether “additional information” is accessed or not. The ProductExhibitor, like all Socratic WebComm tools, can be fully integrated within our active survey environment. Following exposure and study, standard ratings and measurements can be captured using a survey process.

Output
The output from the ProductExhibitor is generally related to the quantitative data captured in the survey following the exhibition. These data may range from attribute communication ratings, purchase intent, preference, likability, etc., to open-ended statements about the concept in general. Behavioral data (e.g., time examining the product, whether the respondent zoomed in on the text, whether the glossary was accessed, etc.) can be used as co-variants in the analysis of data (i.e., “Did those who read the text provide higher ratings?”).

Like the name suggests, the Socratic ProductExhibitor is a standard interface for displaying and demonstrating product characteristics and/or packaging options. Just like in the real world, where display items are put out for customers to examine, the ProductExhibitor allows participants to take a closer look, view the product from various angles, get more information on specific features and spend time becoming more familiar with a product before making purchase decisions.

In the research design application for this technique, we can use the ProductExhibitor in several ways. First, we can use this to give respondents more in-depth exposure to graphic design and feature elements prior to asking them about preferences or comparisons to other, competitive items. Studies involving this type of product demonstration show that findings from product ratings and price-feature trade-off exercises are more like results from tests where respondents were actually able to view a real product than results from tests where the stimulus was a static picture or text description.
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Summary

Configurator Analysis™ is a statistical procedure inspired by e-commerce “build-your-own-product” sites. The method closely mimics the decision-making process people use when determining the basic desired characteristics of a product or service prior to shopping for the best price. Logistical regression is used to determine the relative probability that features are related to purchase intent.

Using a bounded logic “smart pricing slider” system, Socratic begins the exercise by focusing respondents on “what is too cheap to be good?” This helps establish a reasonable floor for price considerations and eliminates anchoring the respondent on a bargain price that is actually too low.

Pricing and product development literature is rich with study results validating the use of van Westendorp PSM methodology. Some of the most compelling studies take known product categories and show how the technique accurately mirrors real-world pricing data.

Socratic has developed a technique for producing a unique target point at which each respondent is highly likely to purchase the product in question. This UTP can be used as a variable in subsequent questions, in a live online survey.

Once the data are collected, a demand curve is produced using the cumulative percentage of the people with a high purchase probability for a product at any one price. The UTP is the price at which each individual is very likely to purchase the product.

Looking at the distribution of the van Westendorp price ranges can give a clear sense of how the perception of value plays out across the entire sample.

The Unitary Revenue Curve tends to show the ideal price for the product in a mature market and represents the price at which revenue per unit is maximized.

The Range of Competitive Prices helps show the full range of viable pricing strategies. At the high end of the range, producers will begin to lose market share, but reap higher-than-normal profits. At the low end of the range, producers will gain share through enhancing value with a lower price.

Most drawbacks reported by those using van Westendorp technique are caused by:

- Not enough information about the product being evaluated
- Lack of respondent’s current knowledge about competitive pricing in the market
- Confusion regarding the intended market for the product

Most of these issues can be compensated for and avoided through proper setup and pre-evaluation education.
REFERENCES AND BIBLIOGRAPHY

Product Configuration
These references indicate how product development efforts can be made more effective through prototyping and virtual user design.


MacEiroy, W. H. (2001). How the Internet will kill three of the four Ps of marketing (and how market research will be subsequently changed forever). In K. J. Jonas, P. Breuer, B. Schauenburg & M. Boos (Eds.), Perspectives on Internet research: Concepts and methods.


Transaction Cost Economics
In particular, these references discuss how prices are set in various contractual modes of price negotiation based on information, complexity, uncertainty, frequency and difficulty of legal enforcement of the terms of the deal. The underlying theory is that individuals and firms are capable of “reasonable price estimation,” given the parameters listed.


Price Signaling
These references are useful in that they explore how price signals quality and how “too low a price” can indicate negative product and brand attributes.


Socratic Technologies, Incorporated, is a leader in the science of computer-based and interactive research methods. Founded in 1994 and headquartered in San Francisco, it is a research-based consultancy that builds proprietary, interactive tools that accelerate and improve research methods for the study of global markets. Socratic Technologies specializes in product development, brand articulation, and advertising research for the business-to-business and consumer products sectors.

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