



**USC Marshall**  
*Critical Thinking Initiative*

# Using Analytics

**A Part of the Comprehensive and Fully Integrated Framework for Critical Thinking at the  
USC Marshall School of Business**

# USC Marshall Critical Thinking Initiative



- The *USC Marshall Critical Thinking Initiative* is an on-going school wide effort to enhance our students' critical thinking skills in order to make them more successful problem solvers. Its key components include...
  - ✓ The 5 Step **USC-CT** Problem Solving Process which is designed to help students tackle ambiguous, ill-defined challenges.
  - ✓ The **START** Concept Analysis which is designed to teach fundamental concepts/formulas that are utilized within the USC-CT Process.
  - ✓ **Learning Modules** which are designed to enhance specific skills such as how to reduce biases, how to enhance creativity, and how to evaluate claims & evidence.
- The lesson in this document focuses on **Using Analytics**.



# Using Analytics Module

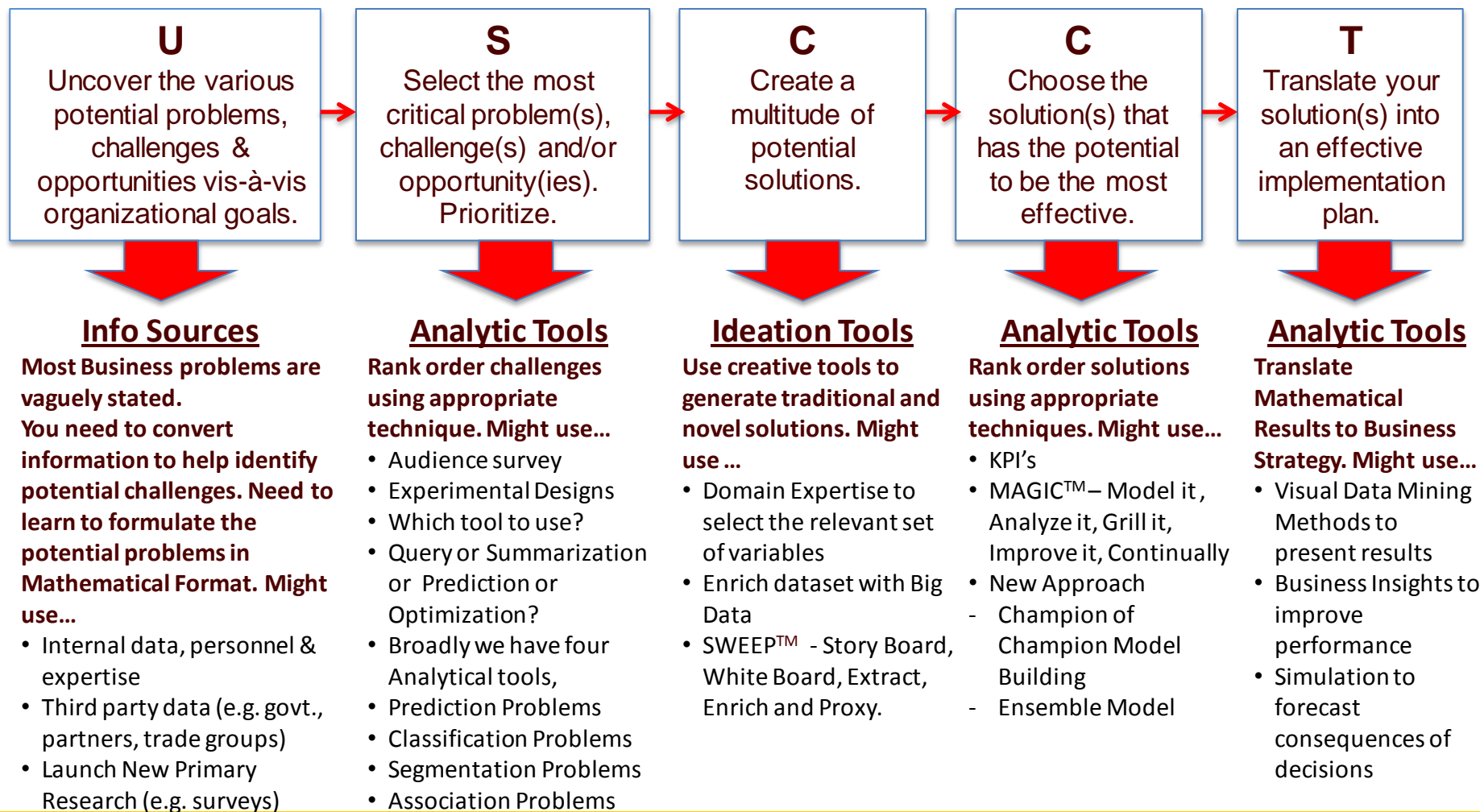
(Note: This document is meant as an introduction to the subject. More in-depth coverage will occur in supplemental readings and classroom exercises)

# Using Analytics Module

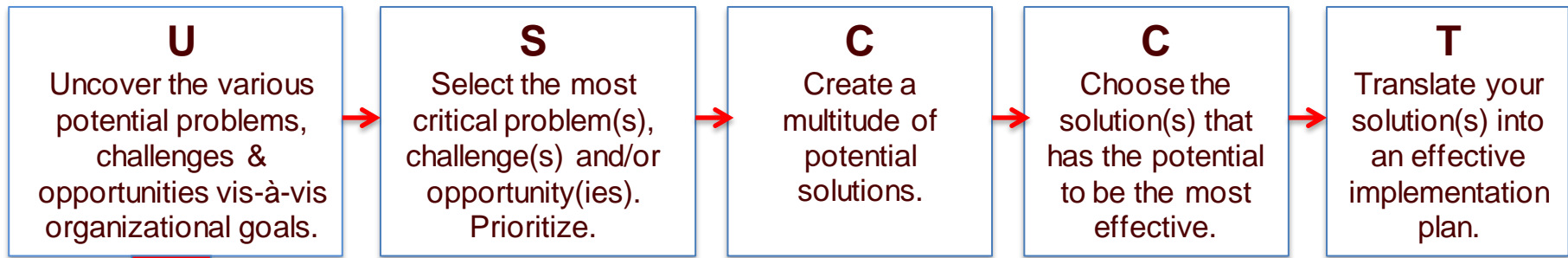


- Objective: This module is designed to acquaint students with quantitative tools used in decision-making.
- Approach: The approach provides an overview of problem solving challenges that often exist and the various analytical techniques that are often used to provide insightful information to fuel decision-making.
- Need: Turbulent Business Environment
  - The Organizations have to do the following 3R's
  - 1. Rapid Innovation
  - 2. Radical Innovation
  - 3. Relentless Innovation

# Using Analytics



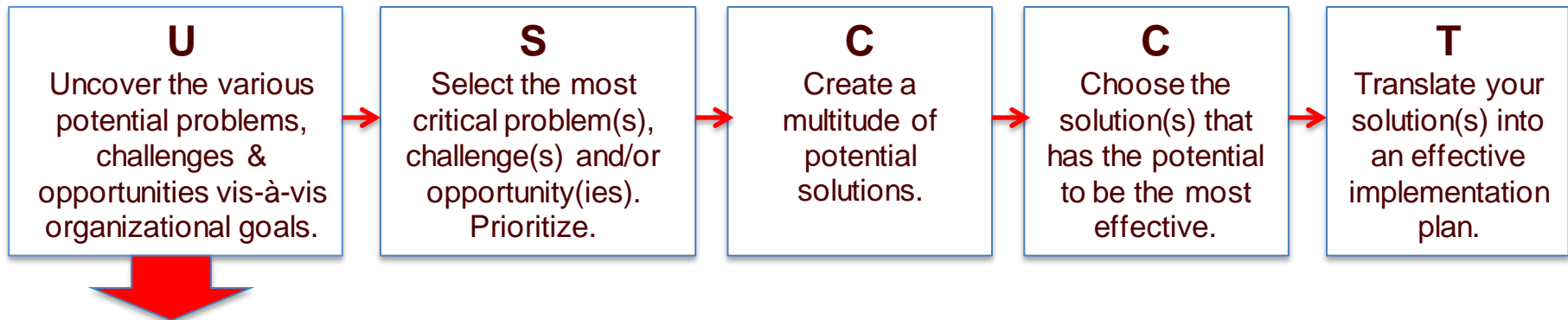
# Using Analytics



**Info Sources:** Search for information that helps identify potential challenges and to formulate problems clearly.

- Personal Expertise: Domain Expertise is important to formulate problems and solve them.
- Example: We want to increase the foot traffic to our store.
- Internal data: These are valuable information which will help you to uncover potential problems and solve the problems. Business Intelligence is a procedure used to manipulate large datasets used to drive decision-making by identifying key issues/challenges or finding key solutions.
- Business intelligence (BI) involves “collecting data, analyzing the data to detect patterns and meanings within the data, extracting information from these analyses, and turning this information into actionable knowledge (Carte et al., 2005)”

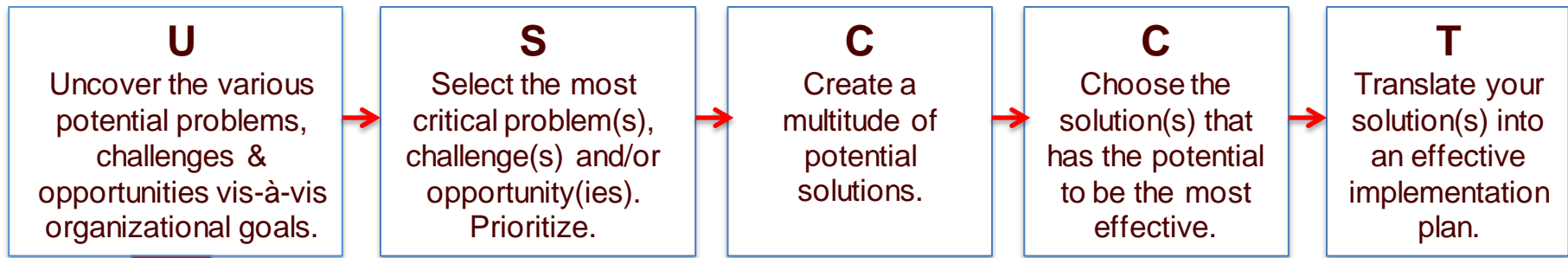
# Using Analytics



**Info Sources:** Search for information that helps identify potential challenges.

- Big Data / Third party data (e.g. govt., partners, trade groups)
- Example: We live in an API (application programming interface) world, we can get the streaming data from traffic websites. We can get how many people live in a particular area from Census data to use estimate foot traffic.

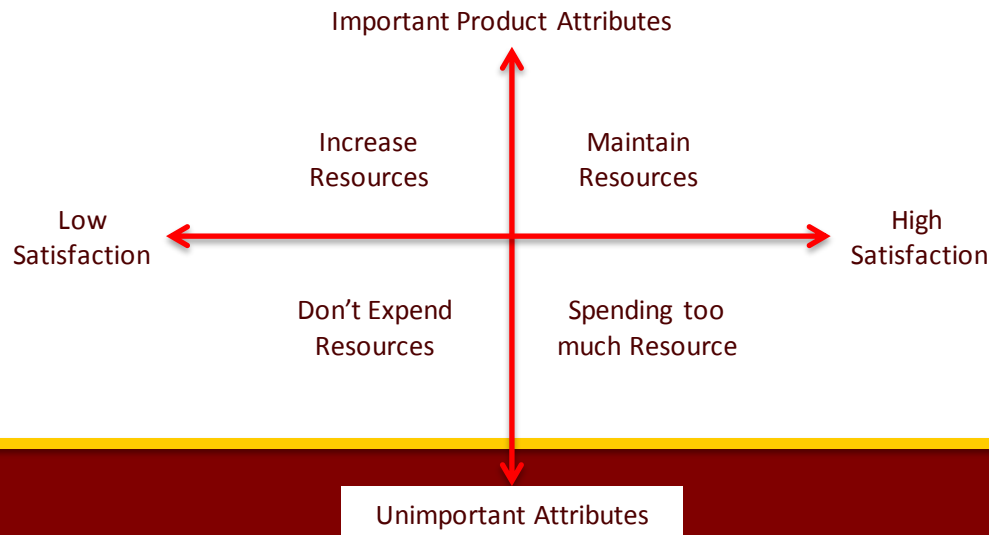
# Using Analytics



**Info Sources:** Search for information that helps identify potential challenges.

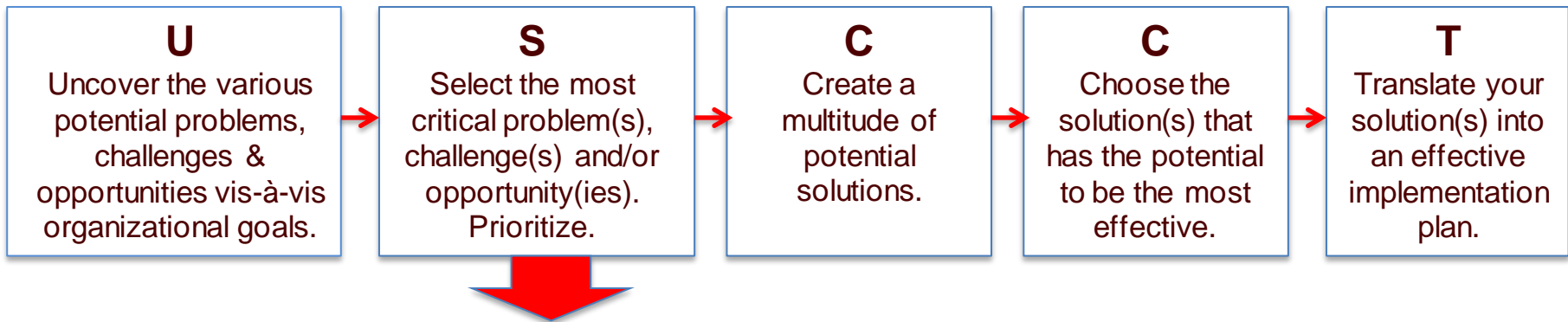
- Launch New Primary Research (e.g. surveys). This includes any number of studies conducted among a target audience for the purposes of identifying audiences and rank ordering likes, dislikes, importance, satisfaction.

- Example: Consumer Satisfaction vs. importance research pin points where to expend resources.





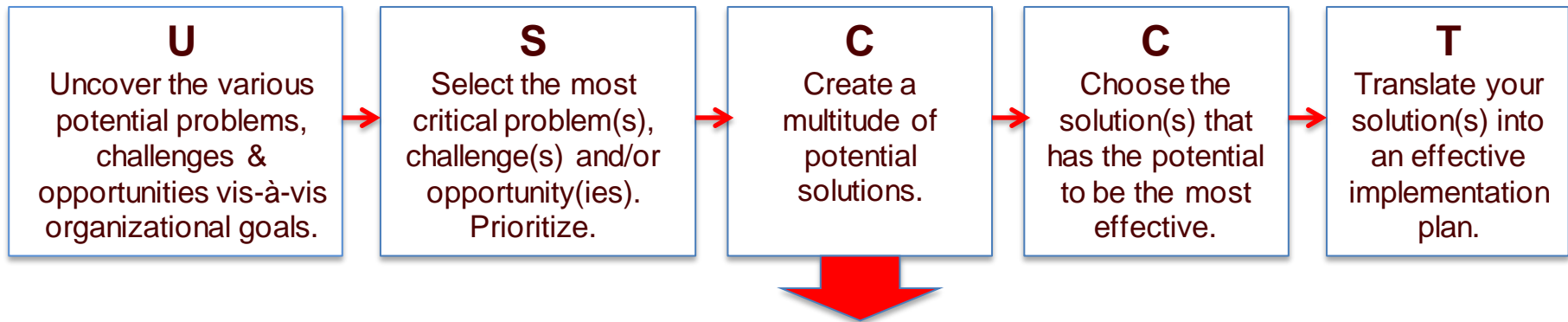
# Using Analytics



**Analytic Tools:** Rank order challenges using appropriate technique.

- Query or Summarization or Prediction or Optimization?
- Broadly we have four Analytical tools - Prediction Problems, Classification Problems, Segmentation Problems, Association Problems
- Example:
  - How many people will visit my store in a given day? Prediction Problem
  - Will “Smith” visit my store? Classification Problem
  - Can we segment the customer who visit my store? Segmentation (Clustering) Problem
  - Which set of stores will they visit in a given day? Association Problem

# Using Analytics

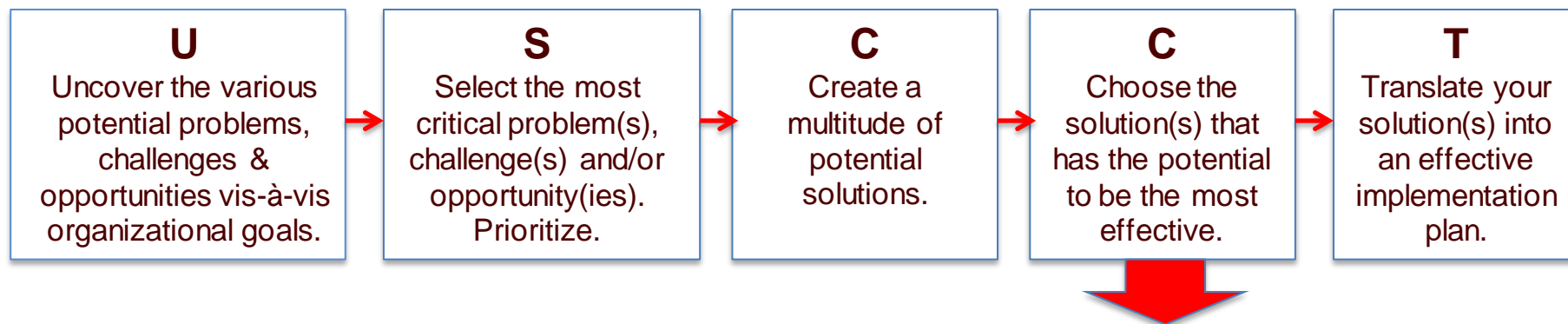


## Ideation Tools

Use creative tools to generate traditional and novel solutions. Examples...

- Build Metaphors Exercise: Ask how other highly successful companies in other industries might handle your situation/problem, such as Disney, Google, McDonalds, etc.  
Note: See a separate **Fostering Creative Thinking Module** for many other creative techniques.
- Domain Expertise to select the relevant set of variables: Which variables do you think contain the information for us to solve the problem we have selected?
- Enrich dataset with Big Data: Is it possible to get other variables to improve the predictive power of our Model?
- SWEEP™ : Do a deep dive - Story Board, White Board, Extract, Enrich and Proxy.

# Using Analytics



**Analytic Tools:** Area Specific Analytical Tools. Might use...

- **Regression:** This is a statistical technique for estimating the relationships among several variables. It can be used, for example, to estimate impact on sales resulting from distribution, product strength, advertising spending, recession, competitive activities, etc.
- Example: How many people will visit the store today?

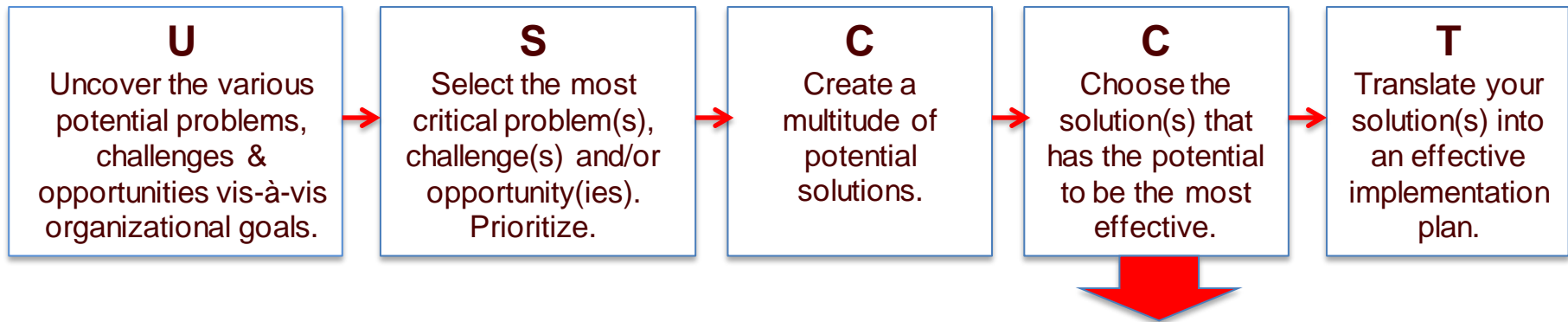
## Model 1

Number of People visiting =  $200 + 3000 * \text{TV Advertising} + 400 * \text{Radio Advertising} + 5000 * \text{Print Advertising}$

## Model 2

Number of People visiting =  $150 + 2500 * \text{TV Advertising} + 300 * \text{Radio Advertising} + 1000 * \text{Print Advertising} + 100 * \text{Internet Advertising}$

# Using Analytics

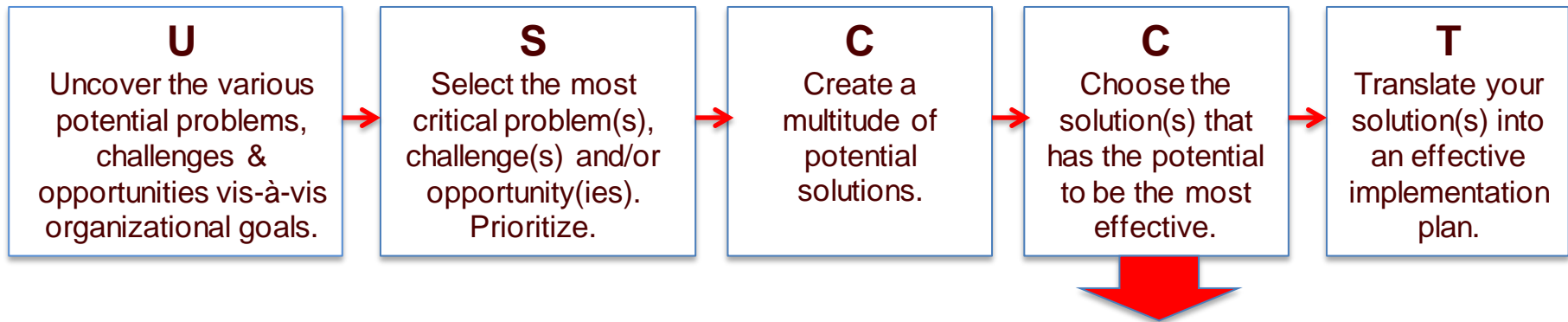


**Analytic Tools**: Area Specific Analytical Tools. Might use...

Now, Which Model to select ?

- KPI's
- MAGIC™ – Model it , Analyze it, Grill it, Improve it, Continually
- New Approach
  - Champion of Champion Model Building
  - Ensemble Model

# Using Analytics

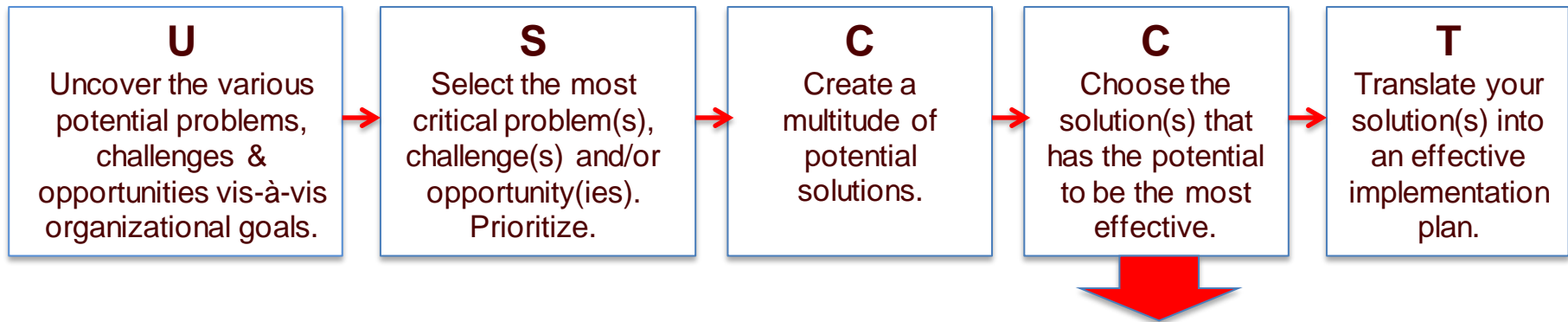


**Analytic Tools:** Other Area Specific Analytical Tools. Might use...

- Propensity/Expected Outcomes. This is a statistical technique used to estimate the probability that certain outcomes will occur. It can be used, for example, to estimate likelihood that a given person will visit your store.
- Example: If “Company A” can introduce a new product that has a 20% chance of making \$10 million in profit and an 80% chance of losing \$2 million. Should they do it? Yes...as the expected value is positive at \$400,000.

$$\text{Expected Value} = (.2 \times \$10,000,000) - (.8 \times \$2,000,000) = \$400,000$$

# Using Analytics



**Analytic Tools:** Other Area Specific Analytical Tools. Might use...

- Conjoint Analysis: This is a statistical technique used to determine how much a target audience values different features that make up a particular product or service. It can be used, for example, to create the optimal product configuration.
- Example: “Company C” wishes to introduce a new retail apparel store, and they current considering 10 options for apparel style, 7 different service options, 5 different price points, and 4 different retail type locations. What’s the idea mix? After allowing customers to mix and match various configurations, the ideal is...

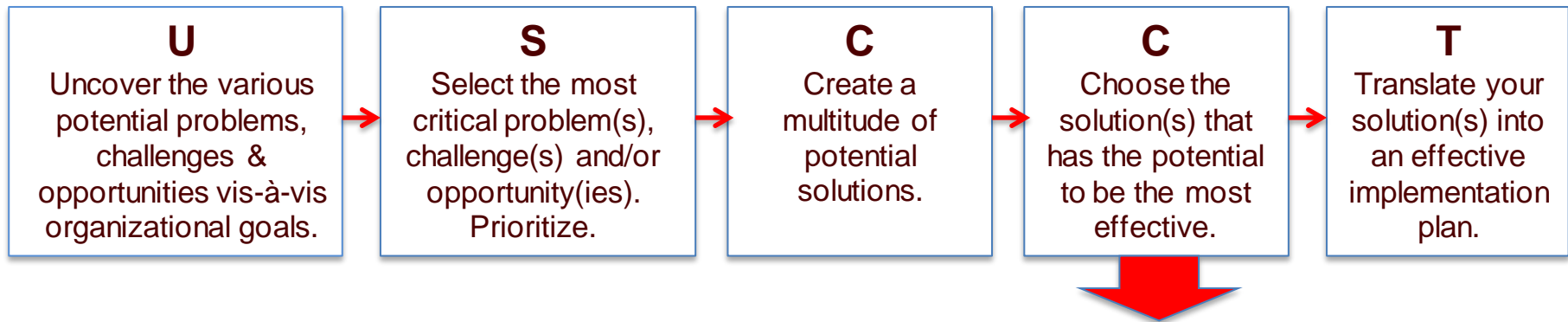
Sportswear

Customer service “consultants” who mix and match outfits for you while you wait

Mid to high price point

High rent urban locations with a lot of active single customers

# Using Analytics



## **Analytic Tools:** Other Area Specific Analytical Tools. Might use...

- **In-Market Test:** This is an experiment used to ascertain the sales potential of a new variable introduced into the marketplace, such as a new product launch or ad campaign, etc.
- **Example:** The Widget Co. wanted to ascertain the ideal marketing mix for a new product launch. So it picked 3 identical test markets and ran different media packages . Option B led to greater sales/profits.

### Option A (City A)

Total Media Spend = \$2mil

- TV=\$1.5 mil
- Print = \$200K
- Radio = \$200K
- Social media = \$100K

### Option B (City B)

Total Media Spend = \$2mil

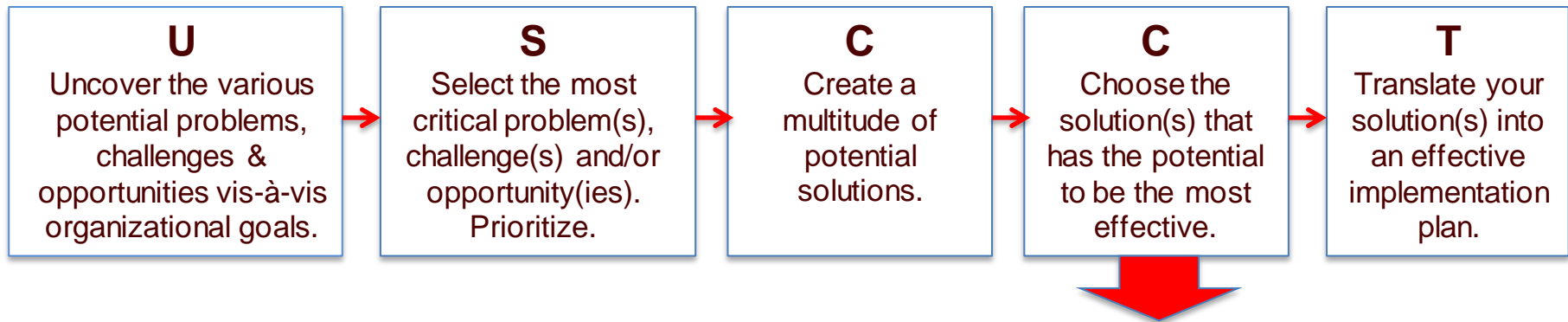
- TV=\$1.5 mil
- Event marketing= \$500K

### Option C (City C)

Total Media Spend = \$2mil

- TV Only=\$2 million

# Using Analytics

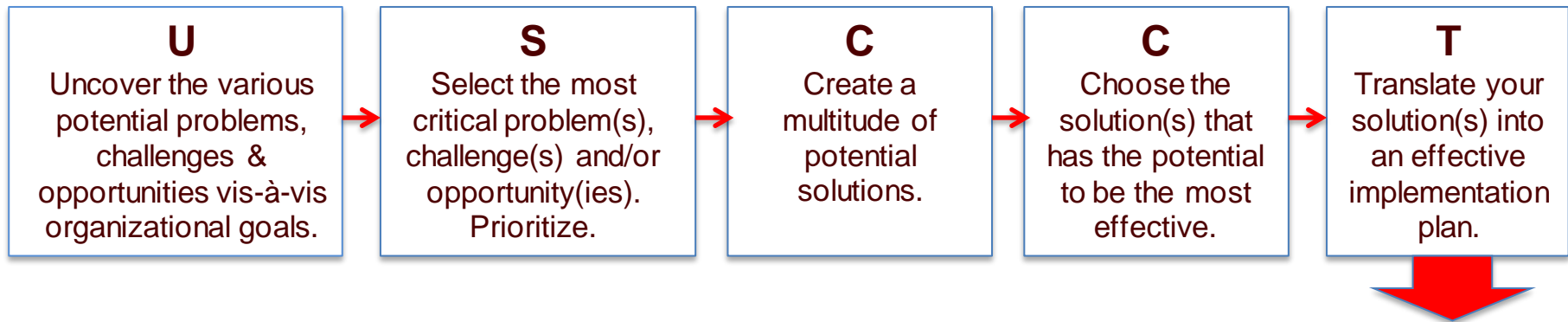


**Analytic Tools:** Other Area Specific Analytical Tools. Might use...

- **Net Present Value:** This is a statistical technique used to ascertain today's value of a series of future returns. It can be used, for example, to determine how much you should pay today for an investment.
- **Formula:**  $PV = FV / (1+r)^t$ . Where "**PV**" is Present Value, "**FV**" is Future Value, "**r**" is the rate of return (as a decimal, and "**t**" is the number of years
- **Example:** You have an investment of 1000 that returns 10% in one year, then in a year it is worth \$1100. Hence, \$1,100 a year from now is worth only \$1000 today.

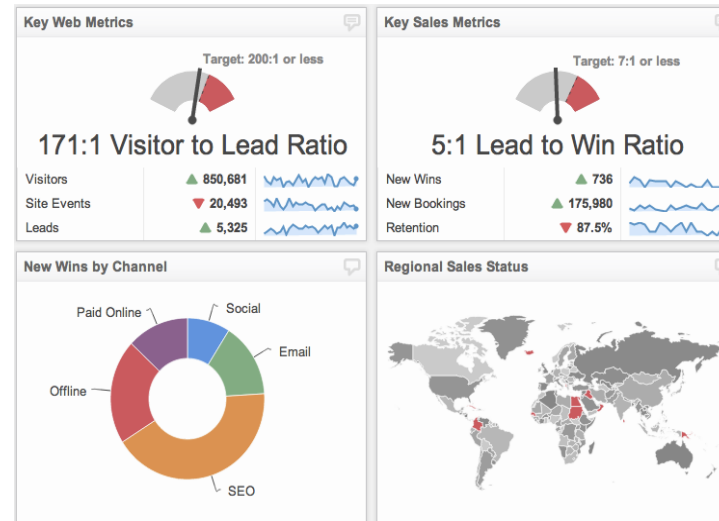


# Using Analytics



**Analytic Tools: Translate Mathematical Results to Business Strategy. . Might use...**

- Visual Data Mining Methods to present results
- Business Insights to improve performance
- Simulation to forecast consequences of decisions



# Using Analytics Module



- Analytical Techniques: The analytical techniques include the following...
  - ✓ Regression Analyses: This is a statistical technique for estimating the relationships among several variables. It can be used, for example, to estimate impact on sales resulting from distribution, product strength, advertising spending, recession, competitive activities, etc.
  - ✓ Probability Analyses: This is a statistical technique used to estimate the probability that certain outcomes will occur. It can be used, for example, to estimate likelihood that a given business decision will result in a profit for a loss.
  - ✓ Net Present Value: This is a statistical technique used to ascertain today's value of a series of future returns. It can be used, for example, to determine how much you should pay today for an investment given how much that investment will return each year for the next ten years.

# Using Analytics Module



- Analytical Techniques: The analytical techniques include the following...
  - ✓ Conjoint Analysis: This is a statistical technique used to determine how much a target audience values different features that make up a particular product or service. It can be used, for example, to create the optimal product configuration.
  - ✓ Research Survey: This is any number of studies conducted among a target audience for the purposes of identifying audiences and rank ordering their likes and dislikes, attribute importance and satisfaction, and potential solutions to problems.
  - ✓ Experimental Design Studies: This is an in-market study used to estimate the impact of changing variables while holding other elements constant. It can be used, for example, to estimate the sales impact of two different advertising campaigns or the volume potential of a new product.
  - ✓ More techniques are available.... You will acquire them during your course of study.



# USC Marshall Critical Thinking Initiative Recap

# USC Marshall: The Critical Thinking Initiative



- The *USC Marshall Critical Thinking Initiative* is an on-going school wide effort to enhance our students' critical thinking skills in order to make them more successful problem solvers. Its key components include...
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Check them all out!