

Business Analytics: Processes and Pitfalls in Value Discovery

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Invited Session Delivered by

Parasuram Balasubramanian Ph.D,
Founder & CEO, Theme Work Analytics
Bangalore, India 560041

Power of Analytics

The most significant problem for any firm is to sit on unsold inventory while a sales opportunity is lost.

Retail Firm



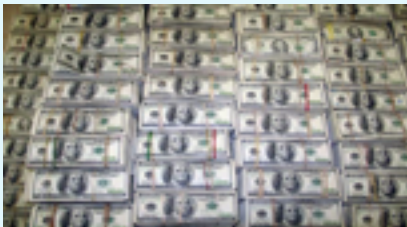
Inventory

I.T. Services Firm



Bench Staff

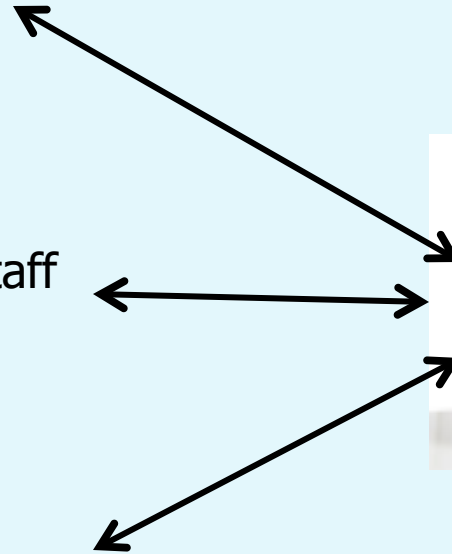
Bank



Unutilized funds



Lost Sales Opportunity



Power of Analytics

It arises due to issues of demand estimation, price and promotion determination and product specifications. (in short, lack of market knowledge)

Retail Firm



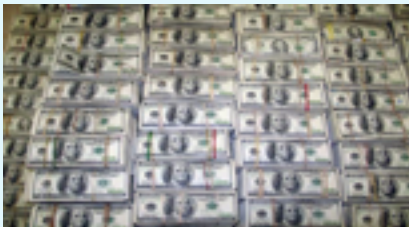
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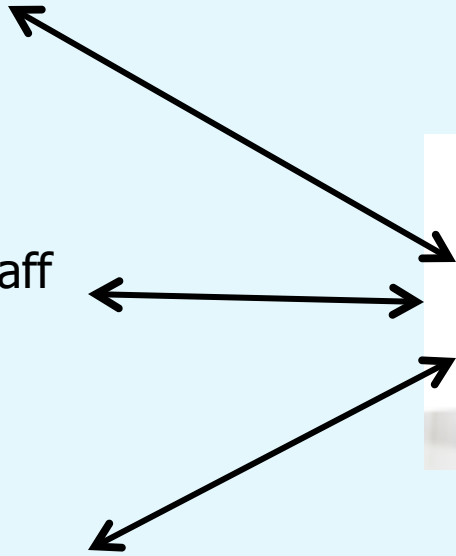
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Unutilized funds

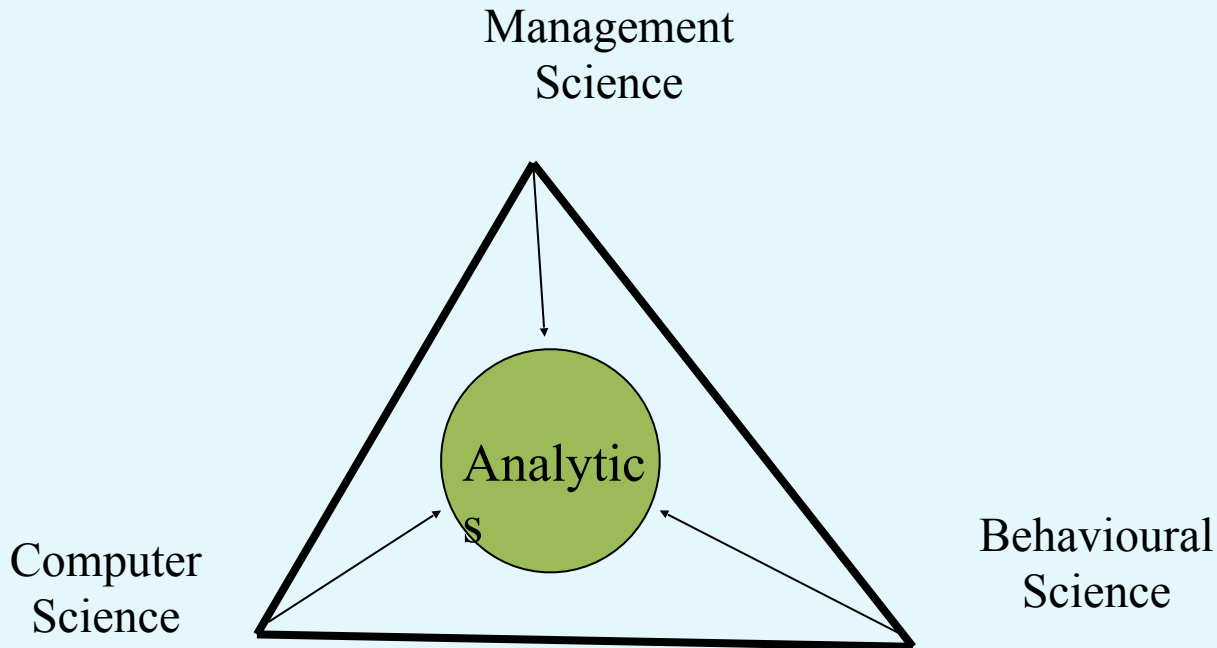


Lost Sales Opportunity



Power of Analytics

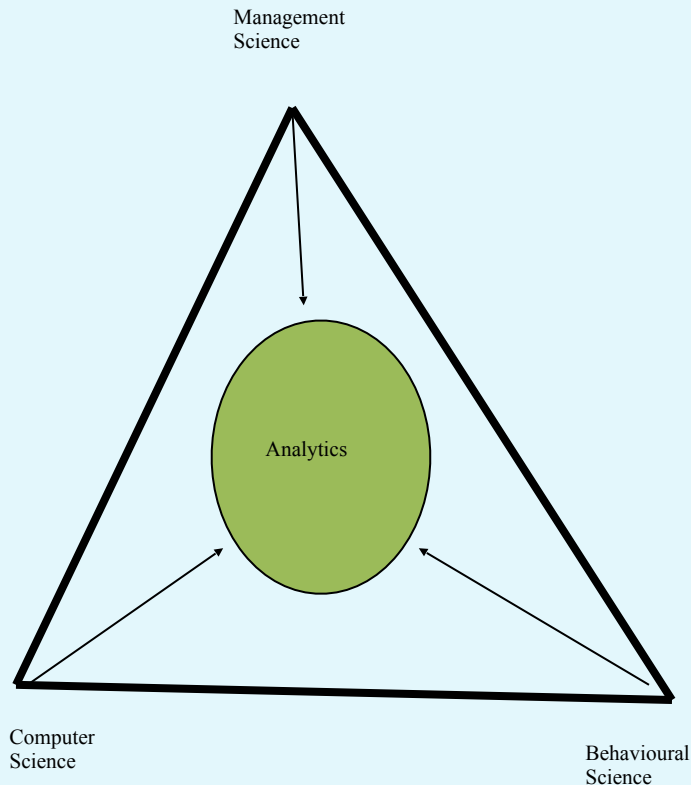
Integrating the concepts and tools from the three sciences we can extract the power of Analytics to address this problem



Hence OR Professionals need to acquire knowledge in multiple disciplines

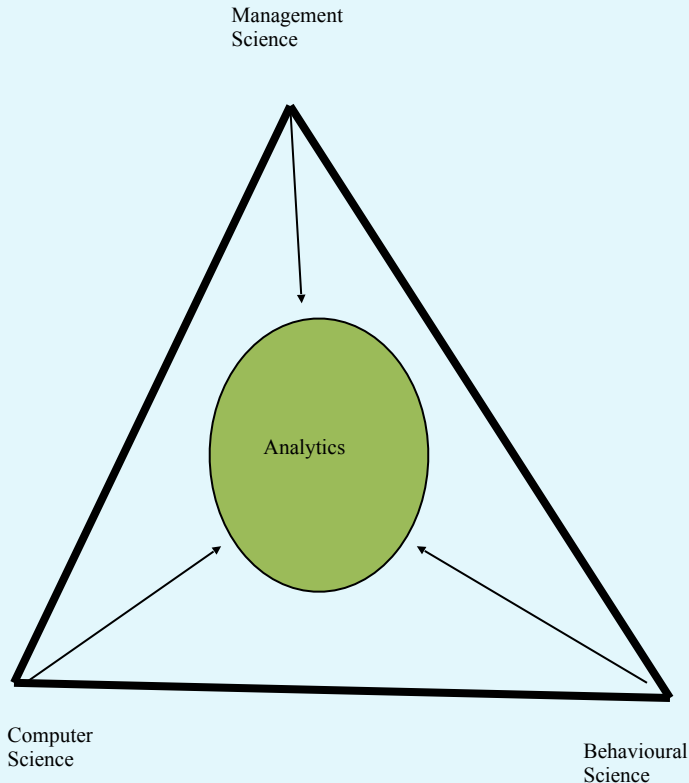
Power of Analytics

History reveals that.....



- ❖ Management Science grew with the field of Operations Research. Data issues inhibited its growth till 1970s.
- ❖ Explosive growth of Computer Science till 2000 acted as a fodder for growth of Analytics.
- ❖ Internet, POS, Mobility, Big Data and Location Aware Technologies are fueling the embedding of Behavioural Science into Analytics.

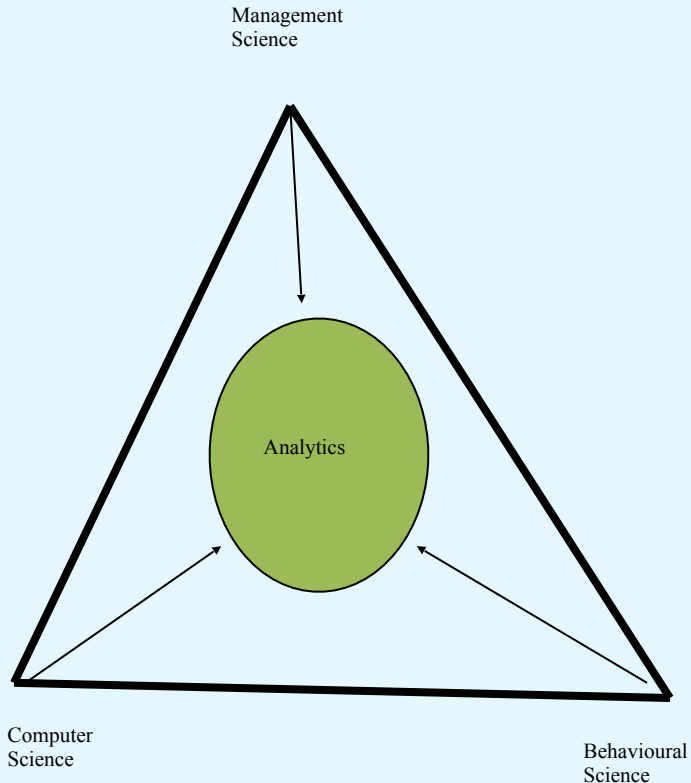
History reveals that..... Analytics facilitates the refinement of market segmentation



- ❖ Credit card services: Capital One segregated the customer base into those taking large loans and repaying them slowly versus those taking small loans and repaying them quickly.
- ❖ Mortgage Securitization: Chase discovered an arbitrage opportunity where there is a gap between market price of MBS and their true worth by knowing the higher probability of a large number of loans being prepaid. Mortgages were rebundled to take advantage.
- ❖ Netflix came up with differentiated incentives for profitable customers who were active customers but rented moves infrequently. all customers paid a fixed monthly rental
- ❖ American Airlines and Marriott implemented yield management concepts in the travel and hospitality segments by segmenting the customer base dynamically.

Power of Analytics

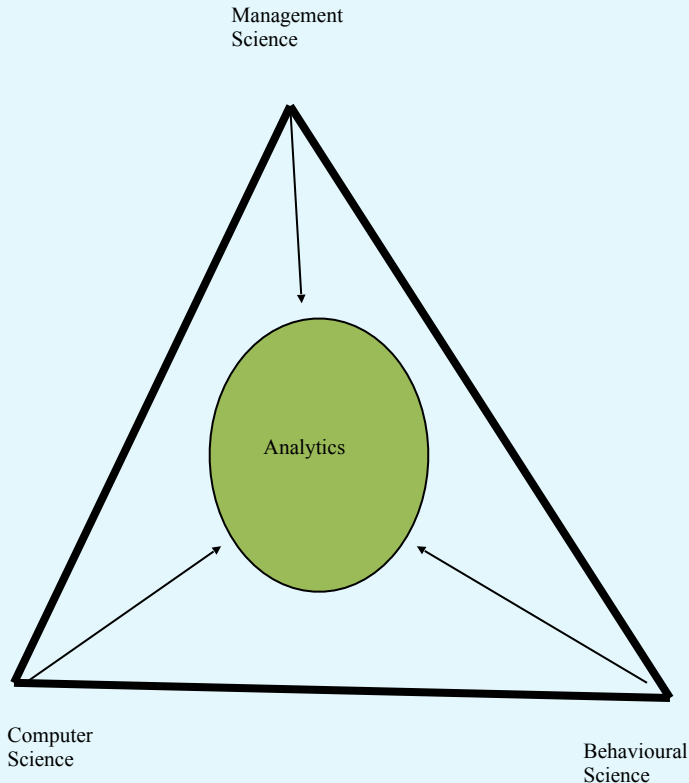
History reveals that..... Analytics facilitates Price Discovery



- ❖ American Airlines and Marriott implemented yield management concepts in the travel and hospitality segments. YM is an initiative that is best suited for Price Discovery as much as for finer segmentation.

Power of Analytics

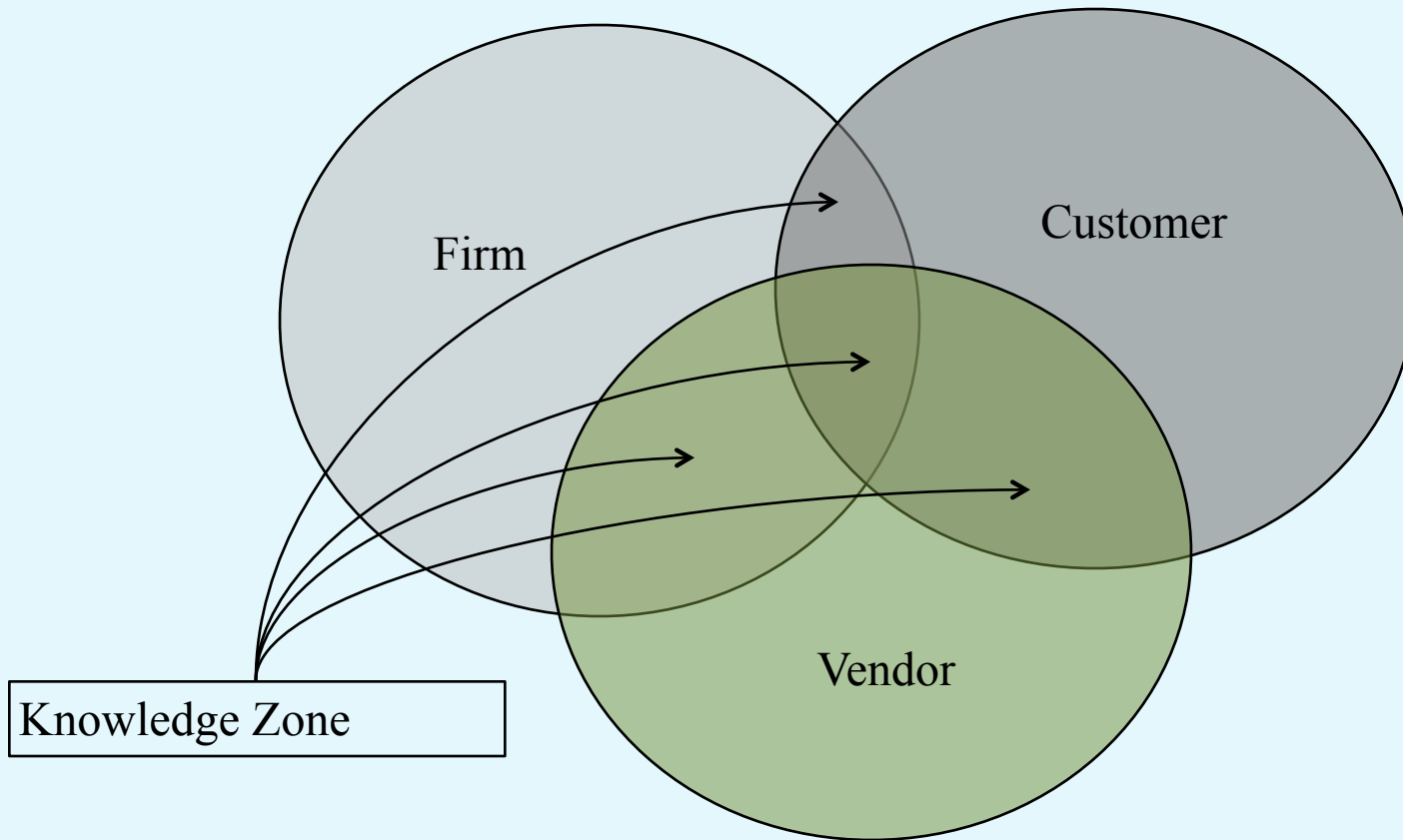
Analytics plays a key role in



- ❖ Determining Price elasticity coefficients and characteristics
- ❖ Developing refined market segments
- ❖ Dynamic allocation of capacity to maximize revenue or yield.
- ❖ Optimal Product functionality for a given segment.
- ❖ Identifying the most cost effective promotions.
- ❖ Selecting the best retention strategies.
- ❖ Optimizing supply chain design and logistics
- ❖ Attraction, retention and motivation of human resources
- ❖ Understanding the complex scenario with respect to diverse risk characteristics of financial products.

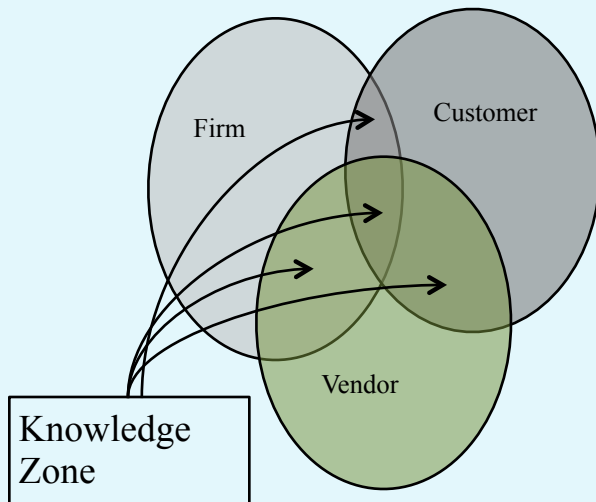
Power of Analytics

Knowledge is found where unknowns are probed. The Firm's interaction with the Market (consisting of Customers and Vendors) is the fertile ground



Power of Analytics

Product functionality, pricing, promotion strategy etc. need constant validation. So is product design.

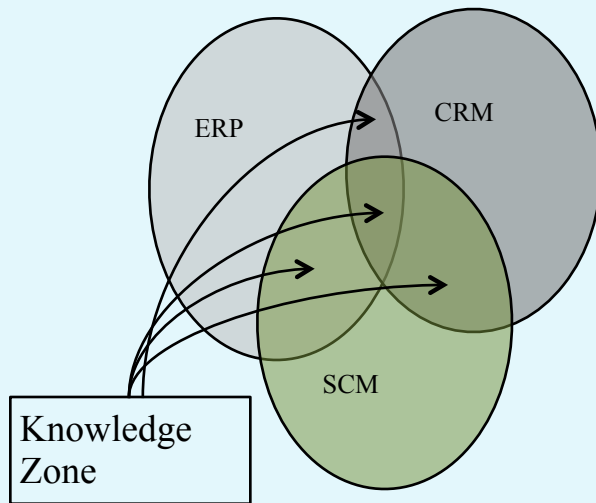


❖ Firm designs the product with many assumptions; Market place is where these assumptions are validated with the product release

❖ Firm can solve many factory and field issues of the product only by tapping the higher knowledge of the vendors

Power of Analytics

ERP, CRM and SCM systems create (or capture) the data and generate usable information. Knowledge extraction however happens only by Overlapping these information in multiple layers.

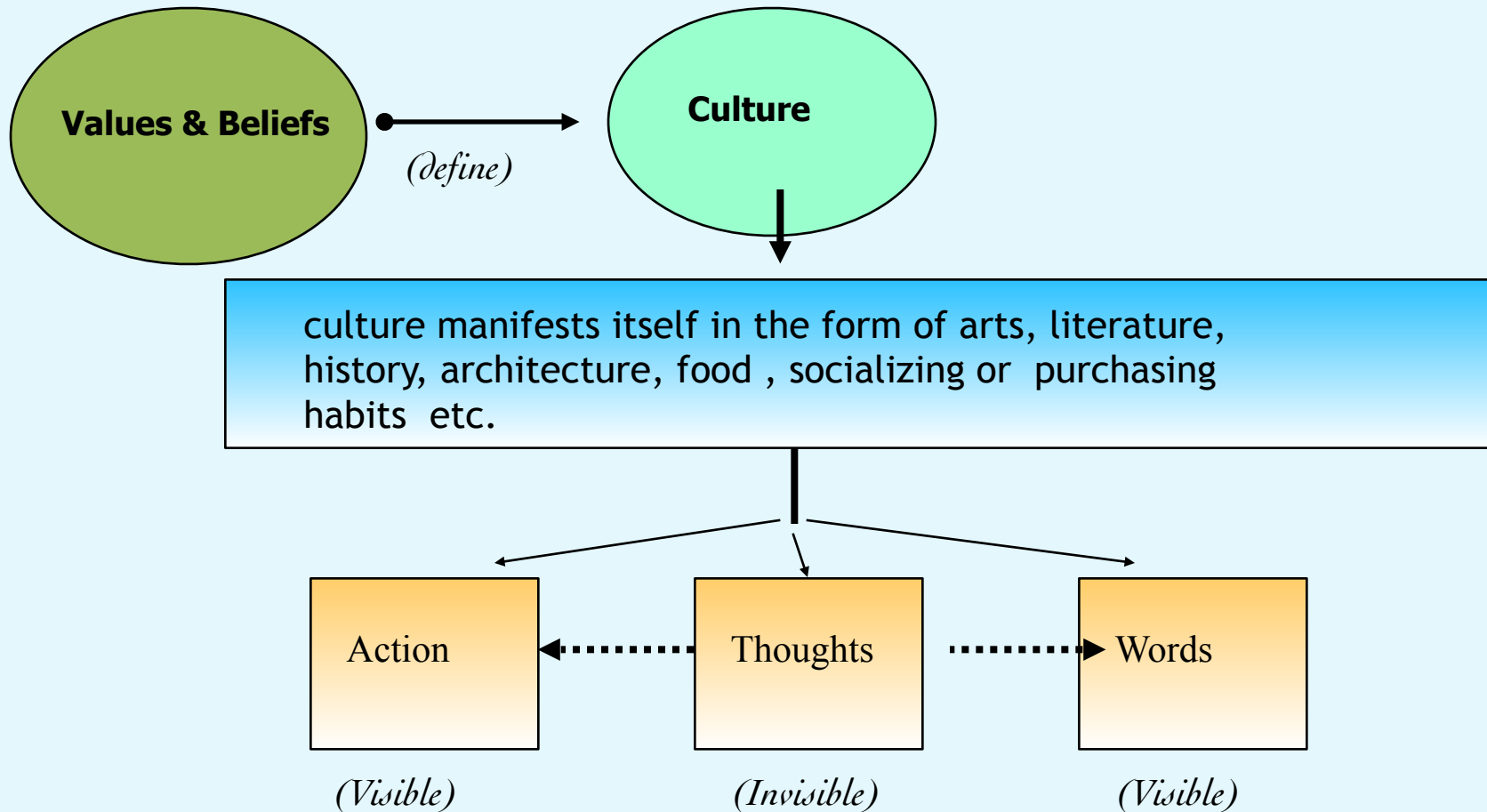


- ❖ Why does this product not appeal to the young affluent?
- ❖ Should our promotional tactics be different in this geography?
- ❖ How can our product be fine tuned for proper balance between price and functionality in every market segment
- ❖ Which vendor can work with us to effect significant product innovations?

O.R. models help to fuse together multiple layers of information

Power of Analytics

Human intent can only be inferred. Words are ambiguous. Action is definitive.



Power of Analytics

Internet and the Online Store has enabled a better understanding of human intent than ever before.

What was he looking for and did not find ?
Why didn't he buy what he found ?

We don't know

We know

Click stream analysis reveals this

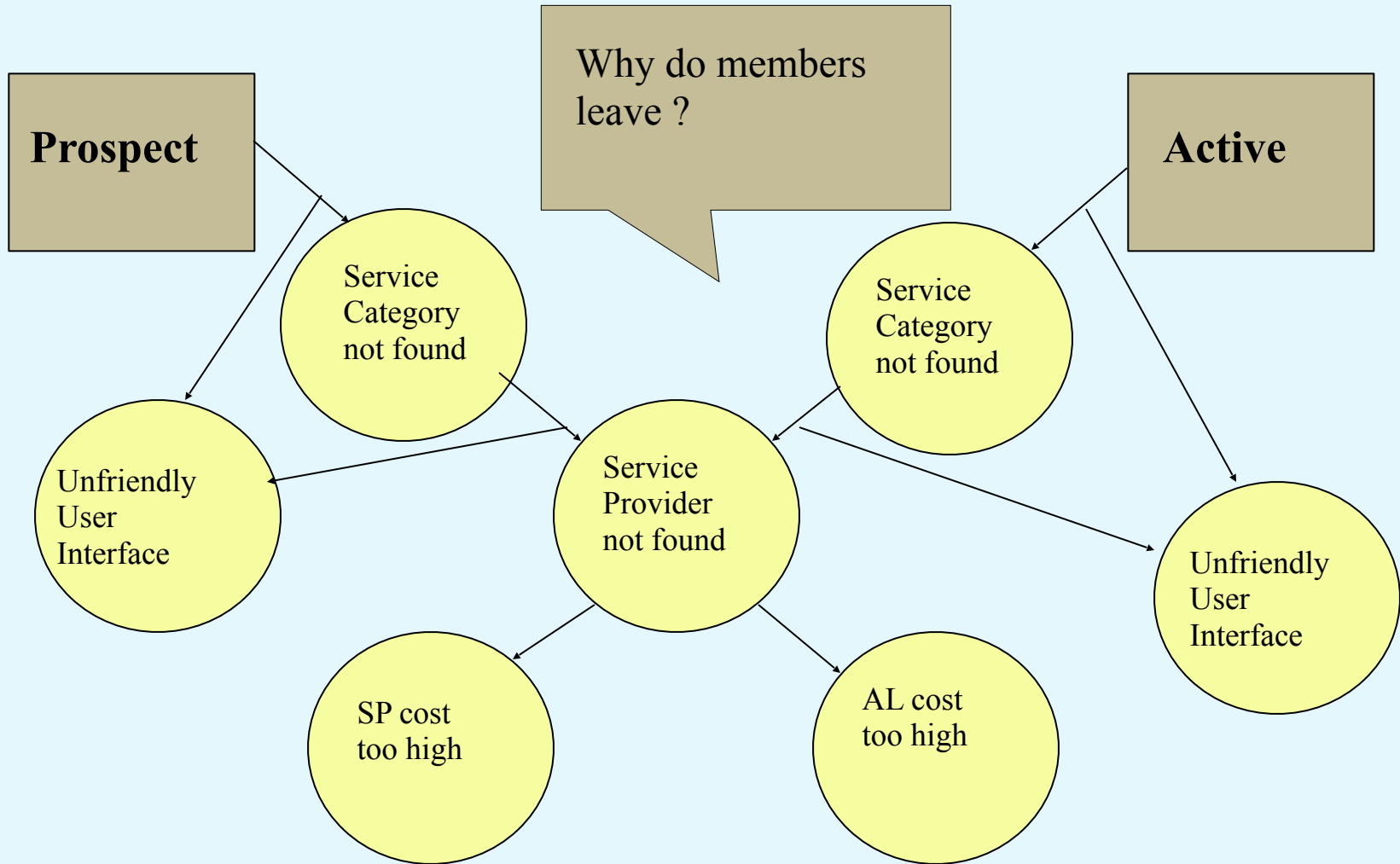


Online Store

The challenge is to determine how representative of the target population he is



Brick and Mortar Store



Click Stream Analysis of P and A state members will provide required data and insight.

Hard Choice Problems to tackle : Examples

- ❖ Selecting patients for clinical trials for new drug testing
- ❖ Distribution of stored/Dam water to conflicting interest groups of farmers, industries, cities for potable water etal
- ❖ Selecting transplant patients for donated organs
- ❖ Closure of unviable public facilities
- ❖ Allocation of runways for planes/airlines when there is fog
- ❖ Allocation of projects to employees

Large volume of data of different types need to be analyzed; offline or real time



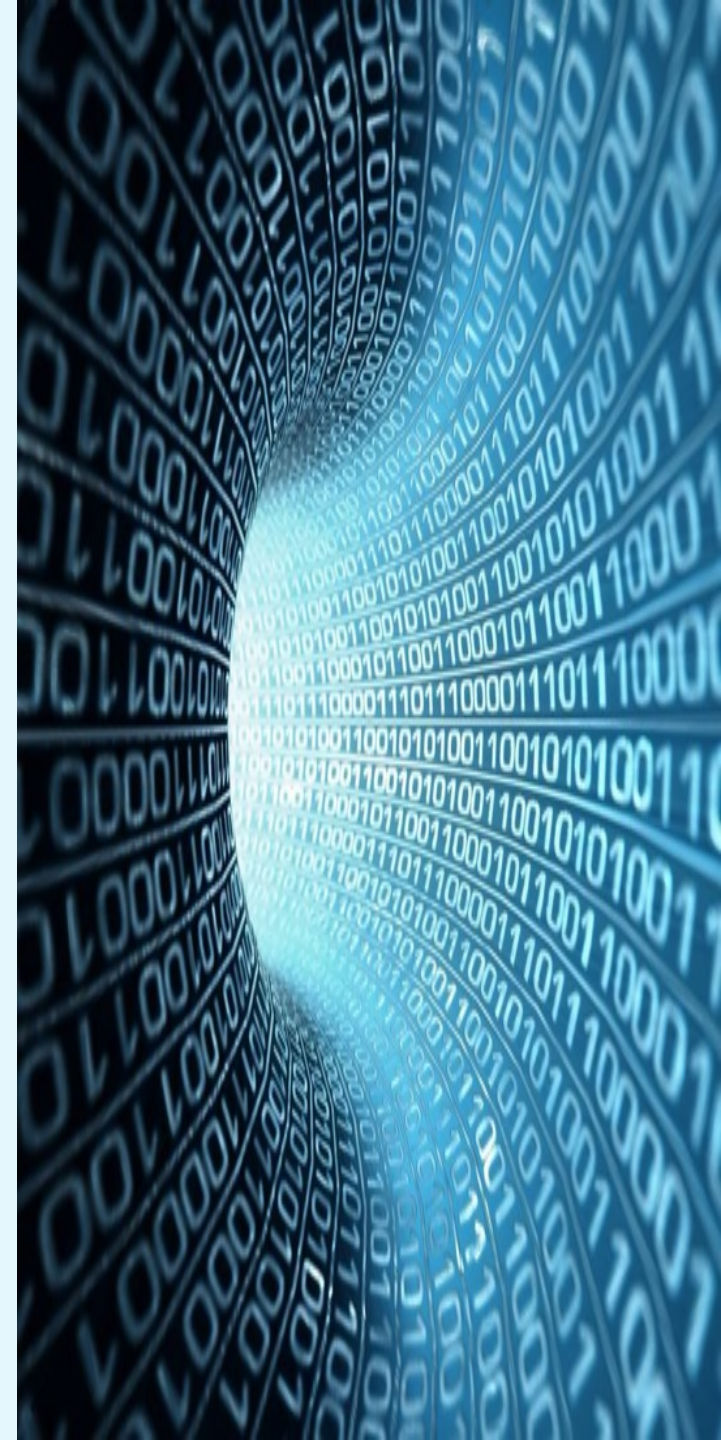
Power of Analytics

Big Data Analytics

Big data refers to large data sets exceeding the limits of normal data base management software.

Vast amounts of data in single or few data sets with volume, variety and velocity

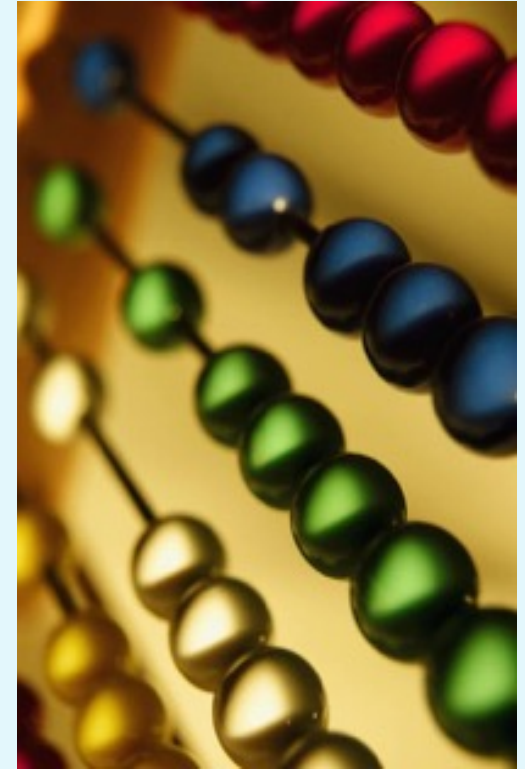
Data includes text, image, audio and video outputs. Data source can be a POS Device, Sensor, phone, ATM or a computer.



Power of Analytics

Big Data Analytics

- ❖ Analytics and particularly the Math Model is the ship with which one can navigate through the ocean of Big Data.
- ❖ Model lends it a purpose and a focus.
- ❖ Provides reliable results in Predictive analysis
- ❖ Most cost effective platform to run numerous “what if” simulations.



Power of Analytics

Where is Big Data Analytics being used today?

Understanding customer preferences, attitudes and predicting emerging needs

Supply Chain and Delivery Management

Health Care Delivery

Churn Management in Telecom sector

Underwriting insurance policies to reflect individual customer's risk ratings

How can prepayment or payment default be predicted ahead of time and timely preventive measures initiated?



Power of Analytics

Social media lets us analyze the spoken/written word to peer into the human intent and validate action based intent deduced earlier.

While using data from Social Media, tread with caution

How representative of the population is the sample data? (This has to be established before projection)

How robust and reliable is the model that extracts beliefs from the Word.
{Can it be validated?}

Can be the most powerful means to tailor a product or promotion methods to suit the needs of an individual.



Power of Analytics

Words of wisdom



Even a strong correlation is no proof for cause-effect relationship

Neither simulation nor optimization offers validation for cause effect relationship

No model can be used to predict outcomes outside the range of the data set used to build the model

Every time before a model is used, we have to ascertain the data range validity



Power of Analytics

Words of wisdom



Models need periodic validation too.

No model can be used to guide decisions at a level of granularity greater than the data used to build the model.

Models form the base of Analytic enquiry.

Knowledge resides at places where uncertainty exists. Uncertainty is the result of diversity. Diversity is the rule of nature.

Analytics is the right vehicle in which such a journey can be undertaken



Thanks and Best Wishes

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Parasuram Balasubramanian Ph.D,
Founder & CEO, Theme Work Analytics
Bangalore, India 560041
balasubp@gmail.com

