

The Messaging Decision: Using Deep Data Analytics to Your Advantage

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Part I

The Information and Messaging Nexus

The Information and Messaging Nexus

Messaging decisions are more complex than typically imagined.

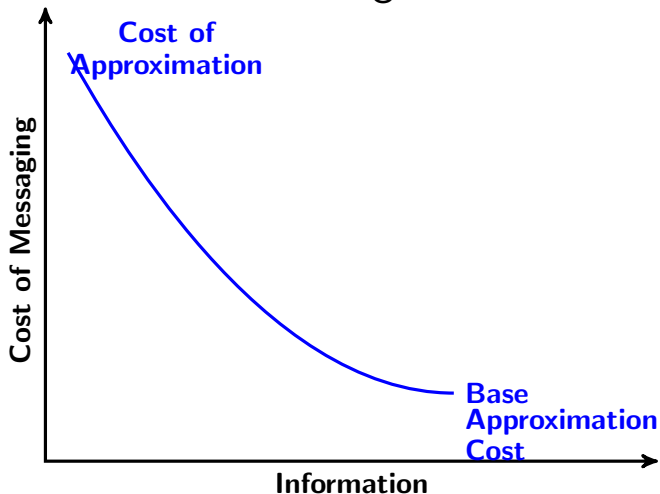
- These decisions must pass executive management requirements and be consistent with corporate images.
- The quality of a decision depends upon the input into that decision.

Main Decision Input

Information

Without information, you have to approximate (i.e., guess) what would succeed – guessing is costly.

There's No Such Thing as a Free Lunch



The Information and Messaging Nexus

Information Misconception #1

Information is binary.

Information Continuum¹



Information Misconception #2

Data are information.

Poor Information

- Raw
- Disorganized
- Fuzzy
- Unfiltered

Analytical Bridge

- Cleansing
- Organizing
- Modeling
- Reporting

Rich Information

- Insightful
- Organized
- Clear
- Filtered

¹Based on Zahay et al. (2004)

Information Misconception #3

All analyses to extract information from data are equivalent.

Information Continuum



Shallow Data Analytics

- Means
- Proportions

- Graphs
- Tabs

Deep Data Analytics

- Regressions
- Elasticities

- Machine Learning
- Predictive Modeling

OLS Regression

The Information and Messaging Nexus

The Heart of Messaging

At the heart of messaging is *Deep Data Analytics*: a paradigm for converting raw, unfiltered data into actionable, insightful, and useful *Rich Information*.

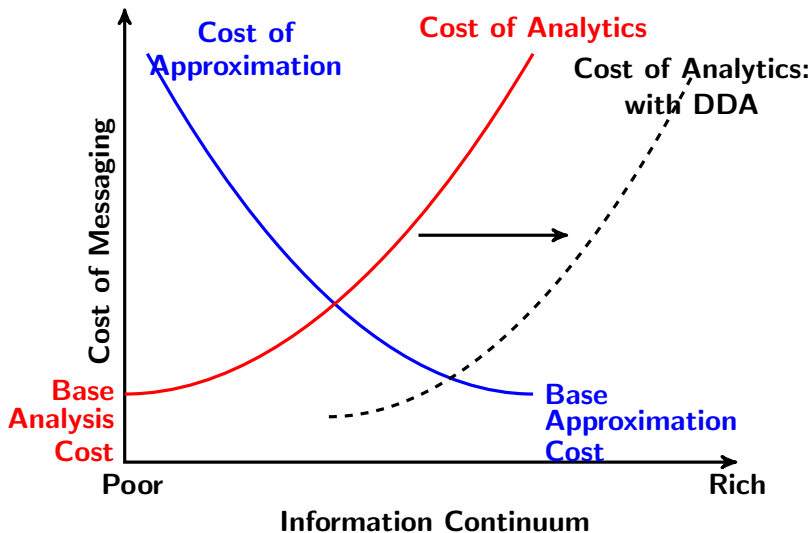
Deep Data Analytics

Deep Data Analytics is the process of taking raw data bricks/Poor Information, regardless of source, and assembling/converting them into Rich Information using advanced statistical, econometric, and machine learning methods applicable to a data set's structure.

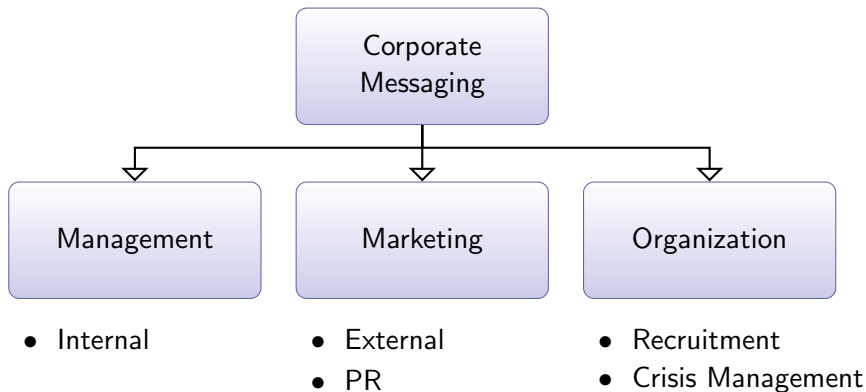
Advantage of Deep Data Analytics

Shallow Data Analytics leave untapped information. Deep Data Analytics reveals Rich Information and reduces the cost of decision making.

There's No Such Thing as a Free Lunch



Information and *DDA* Are Needed Regardless of Messaging

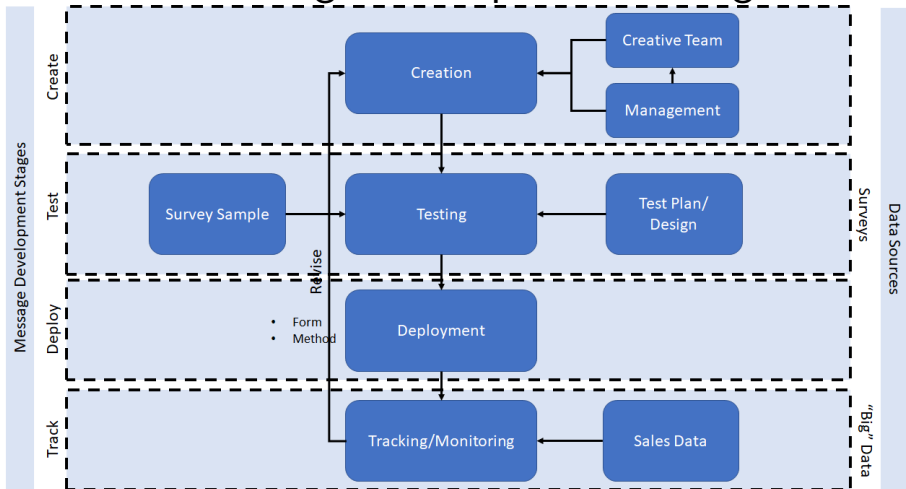


Part II

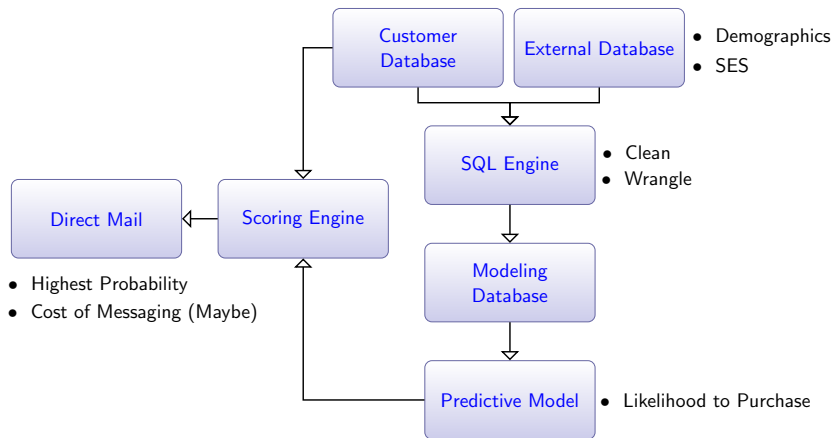
Messaging Paradigm Shift

Messaging Paradigm Shift

Old Message Development Paradigm



Old Paradigm: Analytical Process for Direct Mail



Deployment Decision Rule

Mail/send message if:

$$\text{Expected Value of Sale} > \text{Marginal Cost of Mailing}$$

where:

$$\text{Expected Value of Sale} = \text{Likelihood to Purchase} \times \text{Average Spend}$$

This is intrinsic to prospects so it is an *intrinsic value*. So,

$$\text{Total Value} = \text{Intrinsic Value}$$

Messaging Paradigm Shift

Big Data and Social Media have changed messaging.

- The creative process is the same – but is more data driven.
 - Big Data and Social Media drive pain point identification.
- Deployment impacted.
 - Consumers influenced by friends, family, and strangers.
 - Estimate: 68% of consumers consult others for electronics purchase.²

Viral Marketing^a

^ahttps://en.wikipedia.org/wiki/Viral_marketing

"Viral marketing . . . uses existing social networks to promote a product. Its name refers to how consumers spread information about a product . . . , much in the same way that a virus spreads from one person to another."

Benefit of Viral Marketing

Marginal cost of an extra touch from messaging is zero.

²Leskovec et al. "The Dynamics of Viral Marketing." ACM Conference on Electronic Commerce (EC) (2006) slide presentation available at <https://cs.stanford.edu/people/jure/pubs/>.

Messaging Paradigm Shift

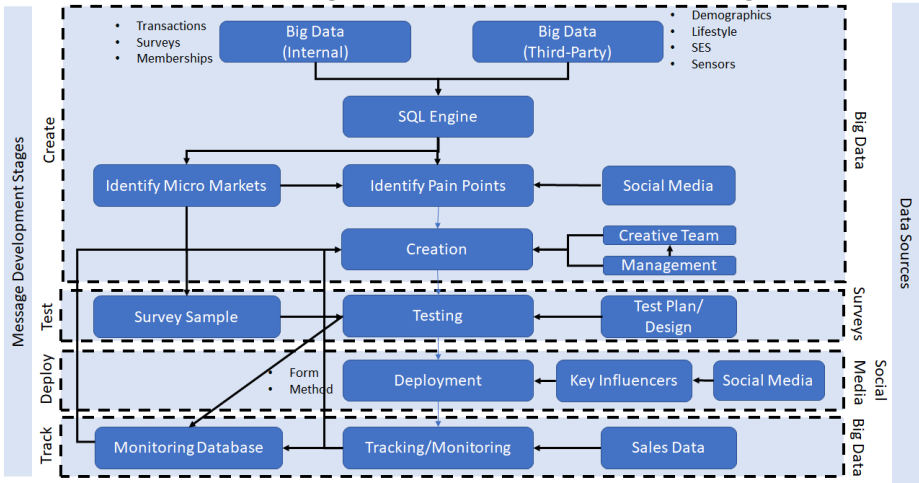
Viral marketing may not be the great hope for increased profitability.

Studies³ show:

- 1 Probability of infection decreases with repeated interactions.
 - Credibility weakens with repeated interactions and repetitious offerings.
- 2 Probability of purchase saturates at a low level.
 - May resist buying unwanted items.
- 3 Diminishing returns to recommendations.
 - Influence is over just a few friends, not all.
- 4 Small, tight-knit communities with few reviews and senders do better.
- 5 "Pricey" products do better: more information sought.
- 6 Products for which ratings do not matter as much do better.

³Leskovec *et al.* "The Dynamics of Viral Marketing." *ACM Trans. on the Web*, V.1, #1, (2007) and Leskovec *et al.* "The Dynamics of Viral Marketing." *ACM Conference on Electronic Commerce (EC)* (2006) slide presentation available at <https://cs.stanford.edu/people/jure/pubs/>.

New Message Development Paradigm



Part III

Total Value of Customers: Reconsideration

Total Value of Customers: Reconsideration

Must consider two values of a customer.⁴

1 Intrinsic Value

- Worth or value *per se* as a customer.
- Individual purchases and *CLV*.
- Predictive modeling of the Old Paradigm targets this value.

Intrinsic Value = Likelihood to Purchase × Average Spend

2 Network Value

- Value due to network connections.
- Positive effect of influencing others.
 - Could have a negative value which would be detrimental.
- New Paradigm includes this value.

Total Value of a Customer

Total Value = Intrinsic Value + Network Value

⁴M. Richardson and P. Domingos. "Mining Knowledge-Sharing Sites for Viral Marketing." SIGKDD 2002.

Part IV

Taking Advantage of a Social Network for Messaging

Taking Advantage of a Social Network for Messaging

Problems with a social network:

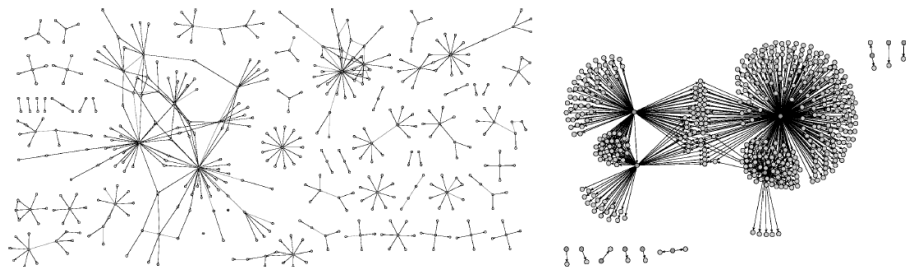
① Complexity Problem

- Each person has a direct/indirect relationship with every other person.
 - Overlapping and interconnected relationships.
 - For N members in a network, there are $\frac{N \times (N - 1)}{2}$ pairwise connections.
 - For LinkedIn with ≈ 106 Million active users, the number of pair-wise connections is astronomical!

② Organization Problem

- Networks are scale-free: i.e., members are not distributed homogeneously
 - There are clumps around central hubs.
 - Hubs are *centralities*.
 - Hubs are key influencers.

Example of Two Social Media Networks⁵



⁵Source: Leskovec *et al.* 2007. "The Dynamics of Viral Marketing." *ACM Trans. Web*, 1, 1, Article 5 (May 2007).

Taking Advantage of a Social Network for Messaging

Definition

Key Influencer Set (KIS): The group of people who influence their friends/coworkers/family members/strangers to take an action by:

- WOM,
- blogs, and
- online chatrooms

to mention a few.

Action Needed

Identify the *Key Influencer Set (KIS)* to optimize the advantage of the Network Value of a network.

Problem

How do you identify a *KIS*?

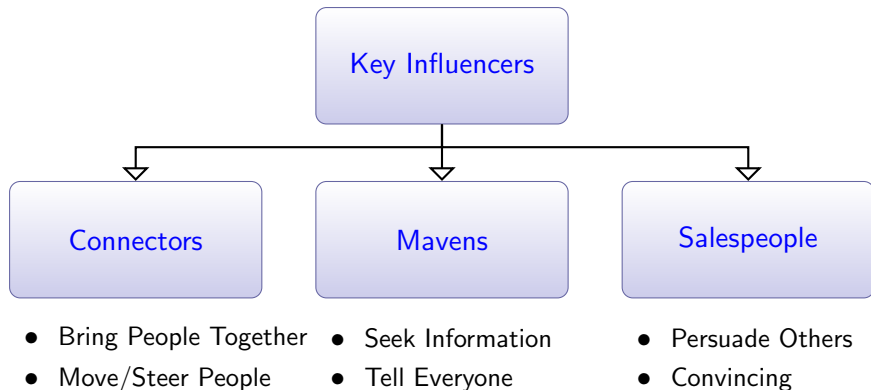
Characteristics of a Key Influencer⁶

Active Mind	Trendsetter	Social Presence
Social Activity	Charismatic	Expertise
Communicative	Power	Shared Interests
Unique	Follow-up Activity	Innovative
Aware	Personal	Amount of Followers
Trustworthy	Early Adopter	Open-minded

This is not useful for identifying specific people for a *KIS*.

⁶Partially based on W. Vollenbroek *et al.* "Identification of influence in social media communities." *Int'l J. of Web Based Communities* (2014, V. 10, #3).

Who are the Key Influencers?⁷



This is not useful for identifying specific people for a KIS.

⁷Based on Hoffman *et al.* "The Lasting Effects Of Social Media Trends On Advertising." *Journal of Business & Economics Research*. (Third Quarter 2016 Volume 14, Number 3).

Identifying Members of a *KIS*: *DDA* Approaches

Measure	Description
Centrality	Identify hub
Association Rules	Identify Item Sets of networks
Black Box	Vendors' proprietary methods

Main Centrality Measures

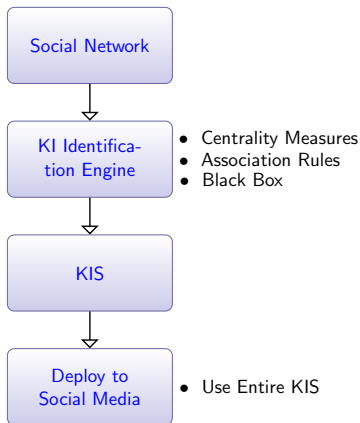
Degree Centrality	Closeness Centrality
Betweenness Centrality	Eigenvector Centrality

Active area of research.

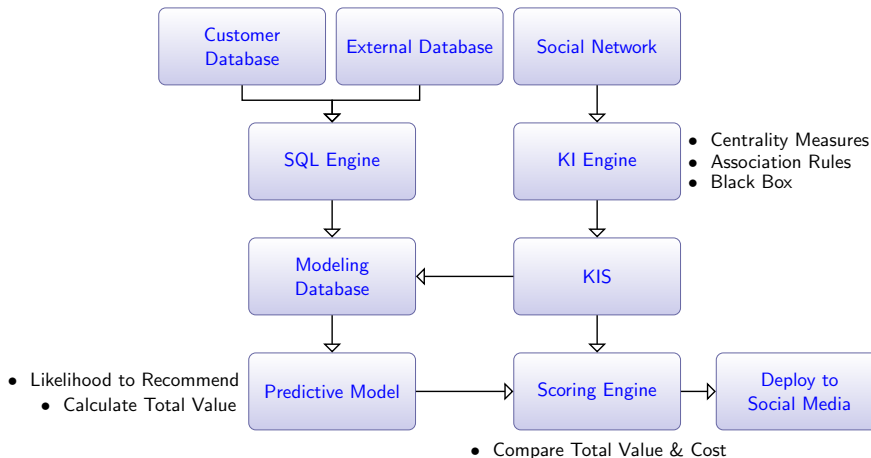
Part V

The New Paradigm and DDA: Incorporating Network Value

New Paradigm: Analytical Process for Viral Modeling sans *DDA*



New Paradigm: Analytical Process for Social Media with *DDA*



Part VI

Summary

Messaging Paradigm Shift

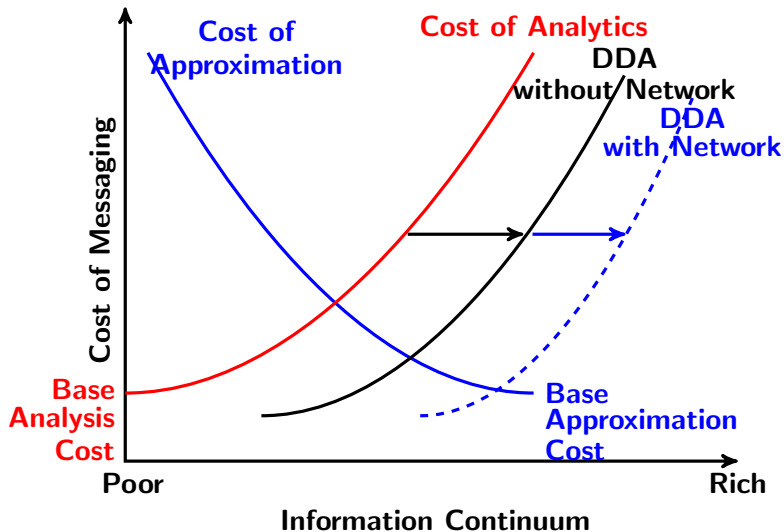
New Messaging Paradigm based on Total Value of Customers in a Network Environment with *DDA*.

Shift in Messaging Paradigm Based on Social Networks



- Mass/D. Mail
- Shallow
- Transactions
- Focus on Sales
- *WOM*/Viral
- Deep
- Connections
- Spread Word

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Part VII

Contact Information



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