# Decision Making During Uncertainty

Vince Barabba

## Project Risk Symposium 2004

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Anaheim, California

# The Journey

1. Context
2. Containing System Distinctions
3. GM Examples
   - Make-and-Sell.
   - Sense-and-Respond
   - Anticipate-and-Lead)
4. Putting It All Together
5. Relevance to Project Risk Management

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# Risk

1. Risk Identification
2. Risk Quantification
3. Risk Response Planning
4. Risk Response Control

# Error Types (old)

## Type I and Type II Errors

Type I is a false positive ... accepting a hypothesis as true when in fact it is false.

Type II is a false negative... r ejecting a hypothesis when it is actually true.

# Error Types (new)

## Type III Error

The probability of solving or working on the "wrong" problem when one should have worked on (attempted to solve) the "correct" problem.

Ian Mitroff

# Error Types (new)

## Type IV Error

Attempting to solve an ill-defined problem set in an highly uncertain environment, while acting as if the problem was clear and the environment surrounding the problem was understood.

# Systems Thinking

Context

# The system is of value when, to the customer, the whole is greater than the sum of its parts!

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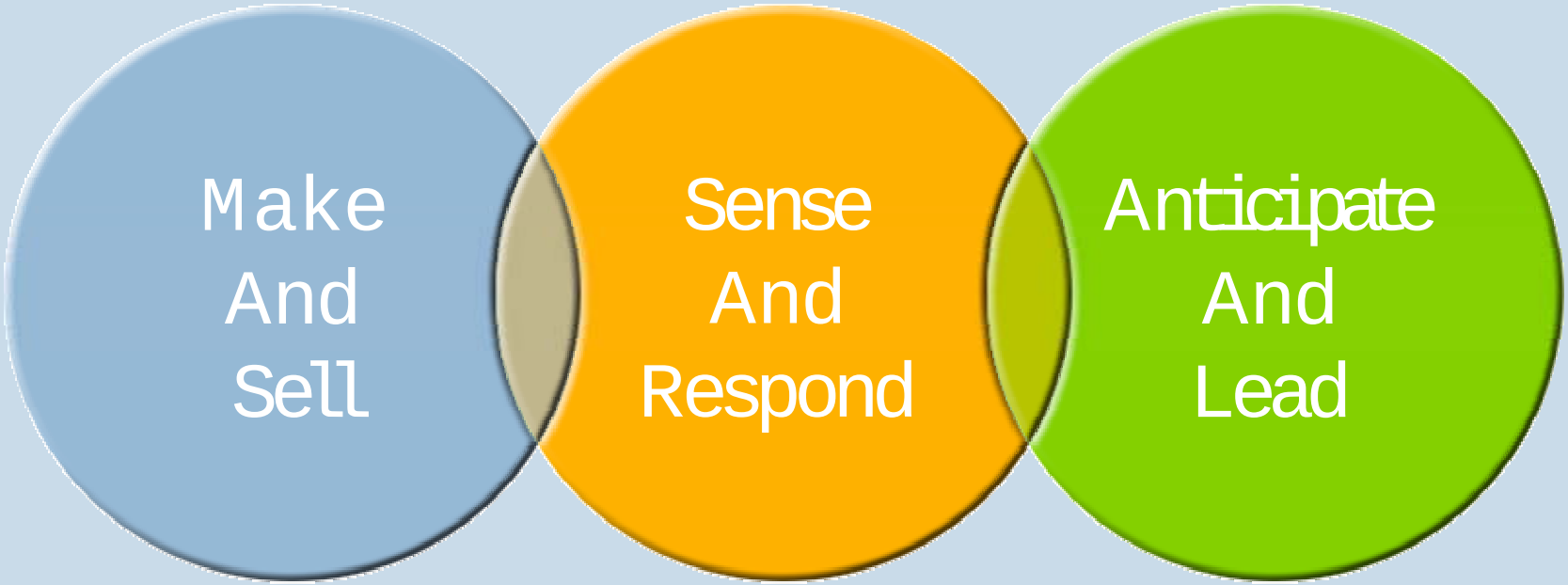
# Not One Or The Other...
# But One And The Other



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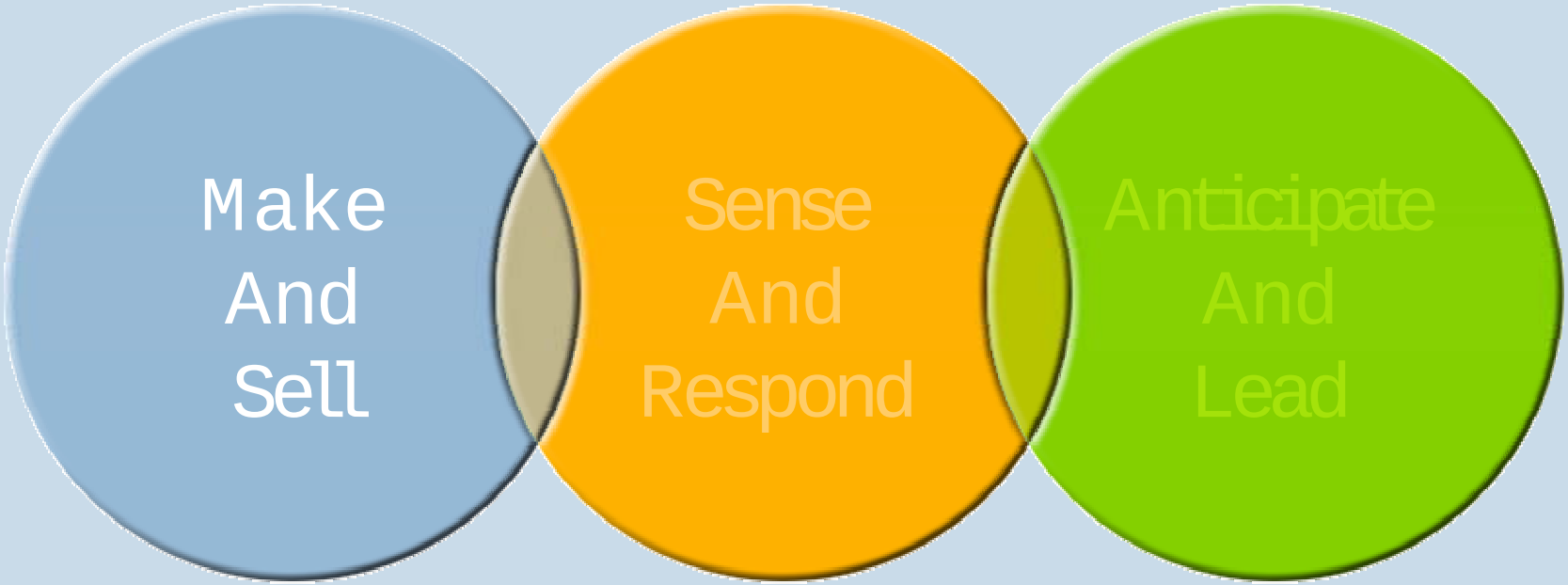

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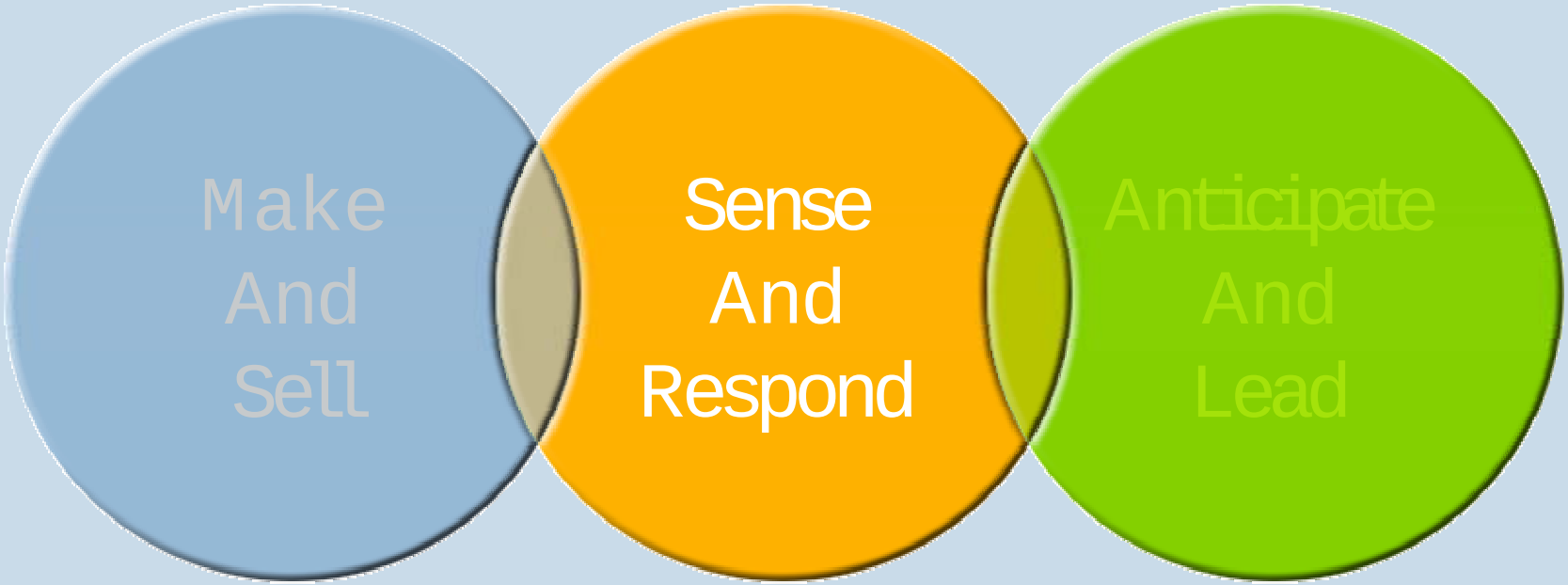

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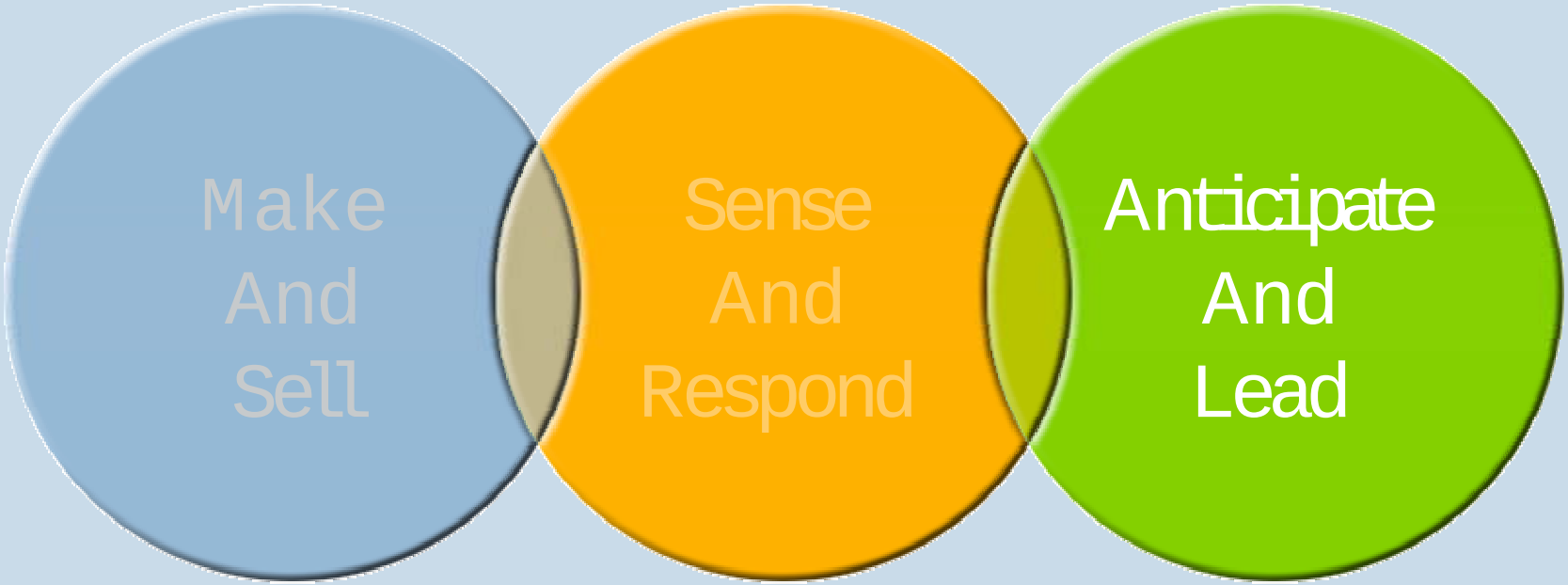

# An example of the Business Design effect..

| Trait | Make and Sell | Sense and Respond | Anticipate and Lead |
|---|---|---|---|
| **Knowledge Management** | We can predict what is likely to happen. Store precise metrics of what we need to know in an accessible information warehouse. | We are not sure what we will need to know. Expertise needs to be codified in processes and identified by individual. | It's not about management… it's about quick acquisition. We need a system that will adapt based on our success in changing the way things happen. |

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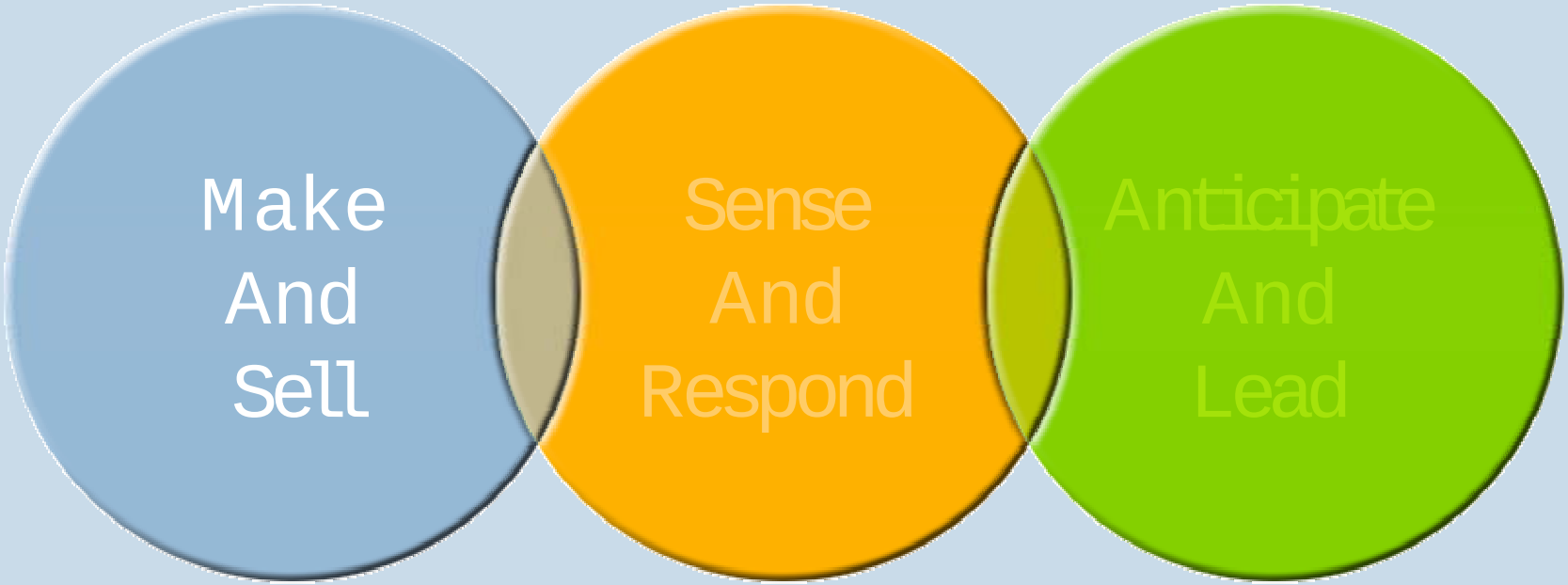

# An Example of Make-and-Sell

GM Examples

# Past is Prologue

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GM Examples

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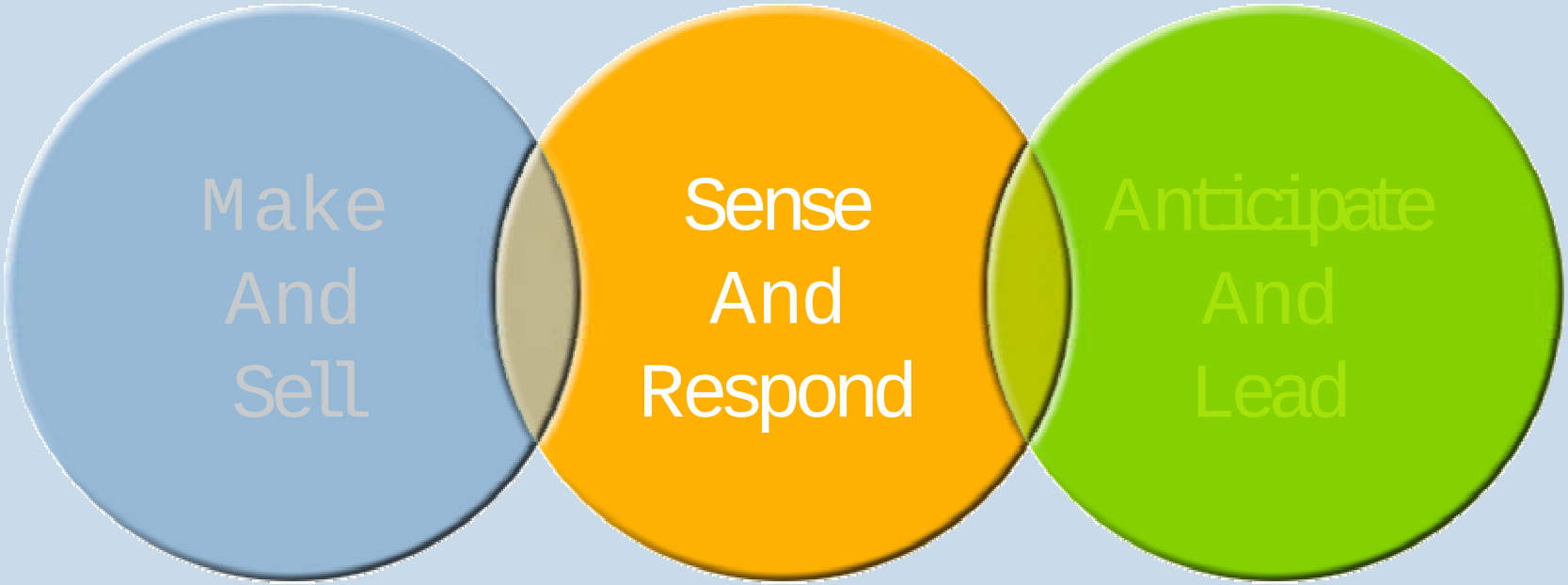


GM Examples

# An Example of Sense-and-Respond

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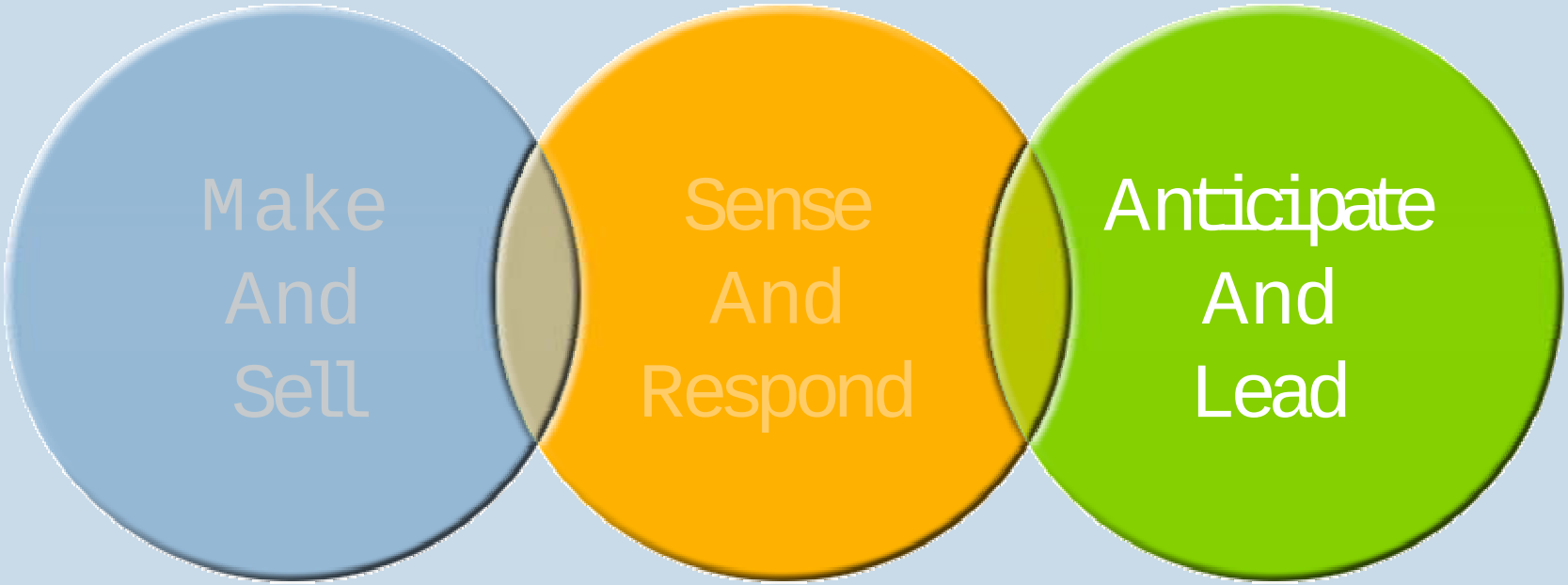


GM Examples

AUTONOMY

# Reinventing the Automobile

# AUTONOMY

GM Examples

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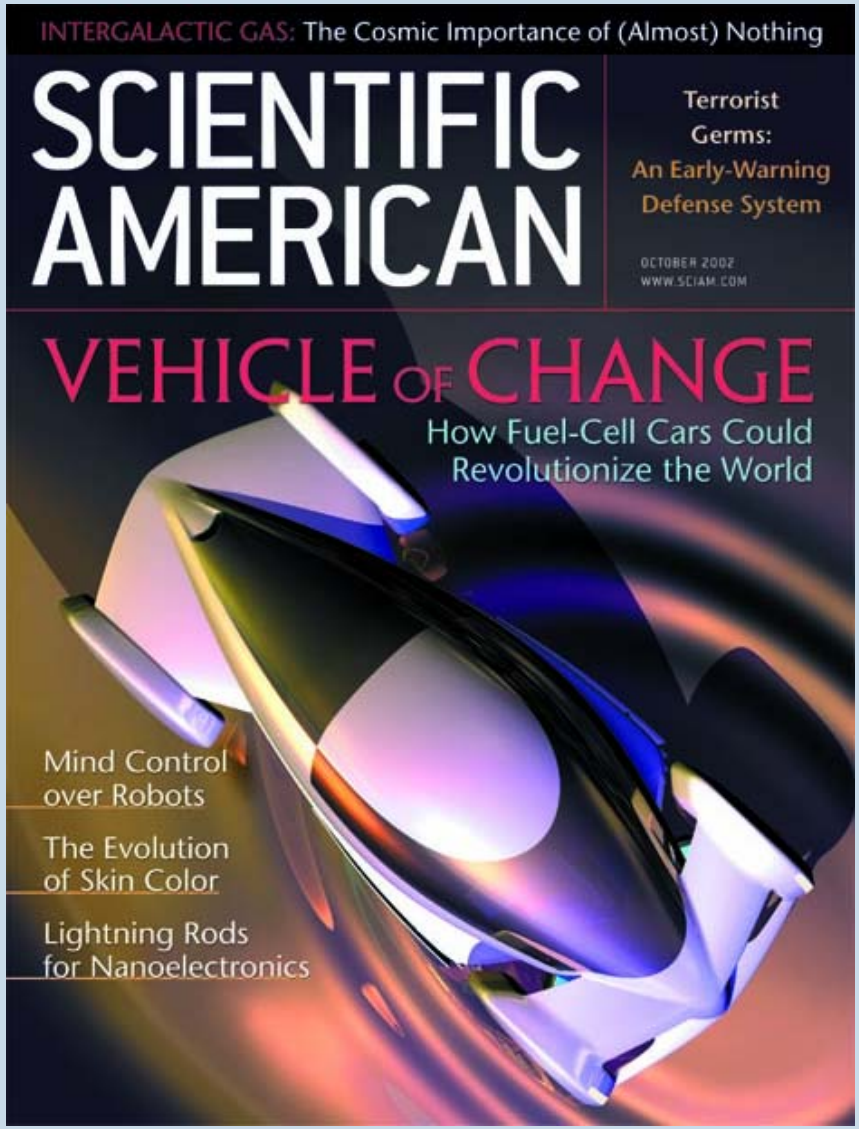
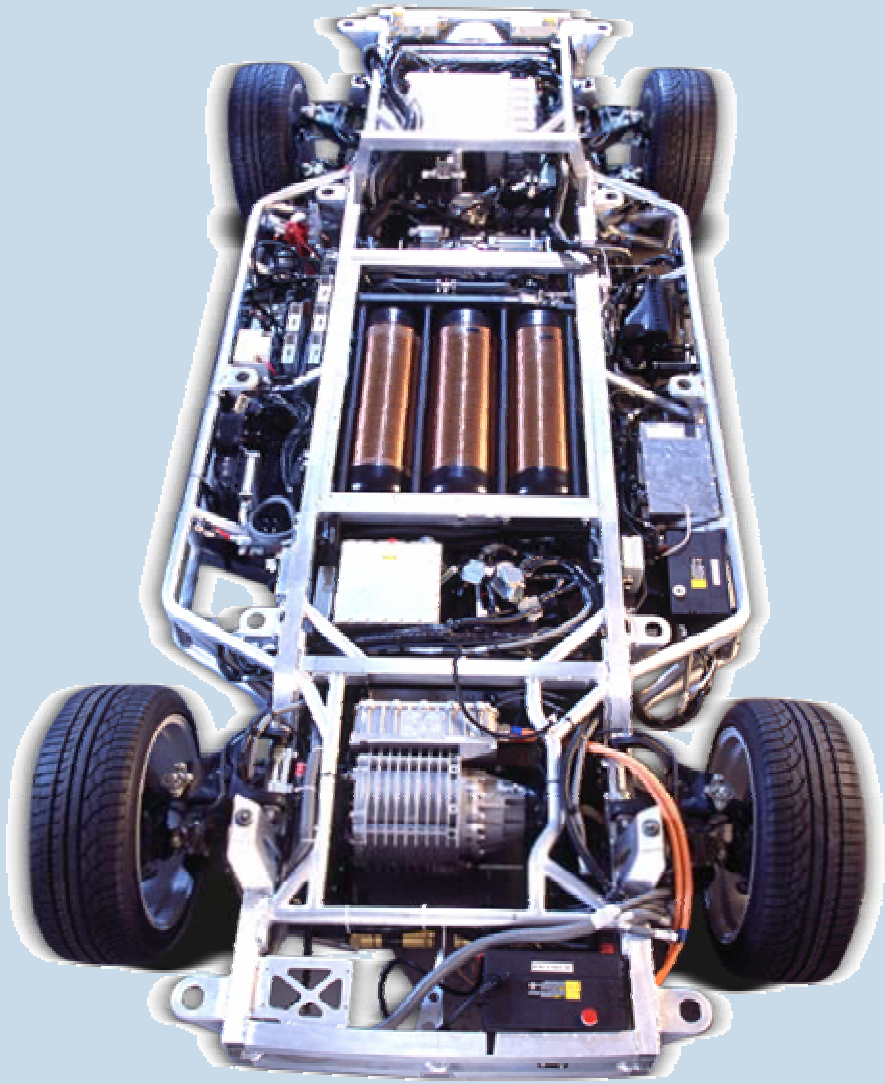
GM Examples


INTERGALACTIC GAS: The Cosmic Importance of (Almost) Nothing
SCIENTIFIC AMERICAN
Terrorist Germs: An Early-Warning Defense System
OCTOBER 2002
WWW.SCIAM.COM
VEHICLE OF CHANGE
How Fuel-Cell Cars Could Revolutionize the World
Mind Control over Robots
The Evolution of Skin Color
Lightning Rods for Nanoelectronics

## GM Examples

# HY WIRE

GM Examples



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# A not too distant example..

OnStar

DIRECTV

GM Parts

ACDelco

GM Goodwrench Service Plus

# A somewhat distant example..

OnStar

DIRECTV

GM Parts

ACDelco

GM Goodwrench Service Plus

# It's not about one or the other …

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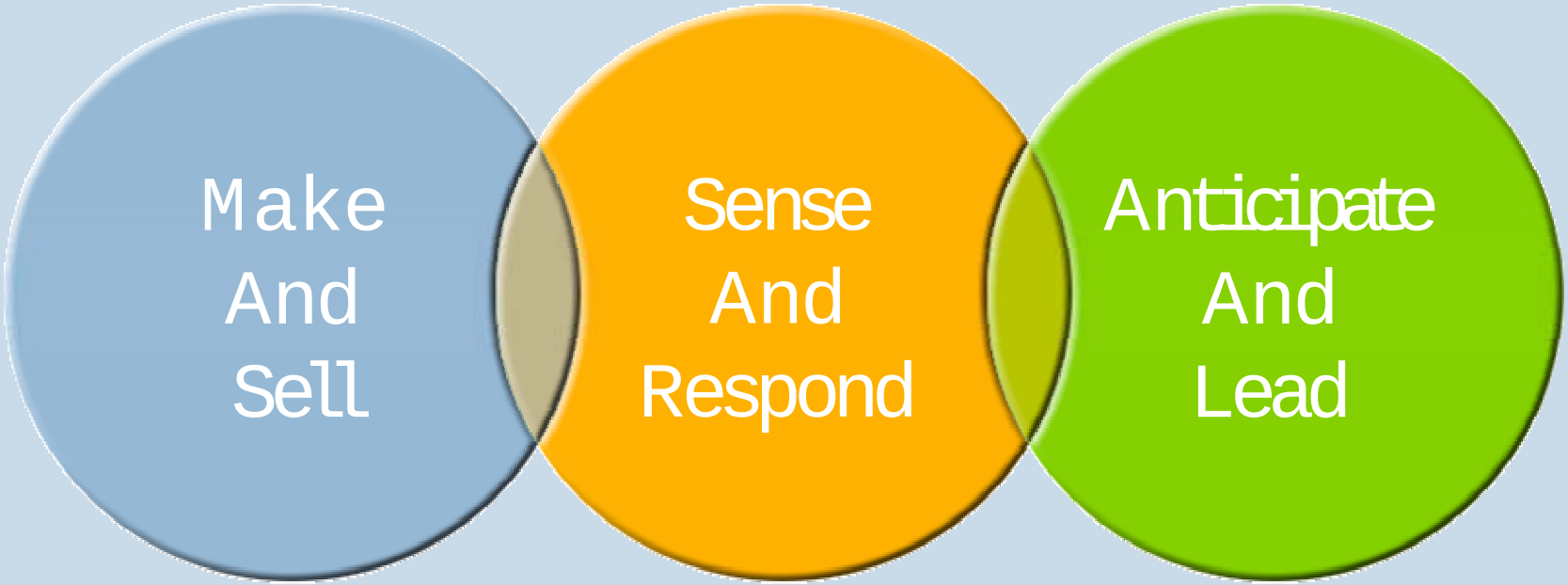

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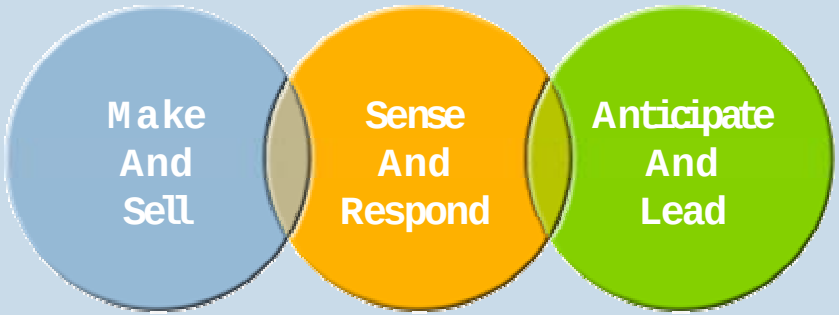
# Implications for Project Management




*Are the current approaches to Project Management sufficiently robust to cover the full range of business designs?*

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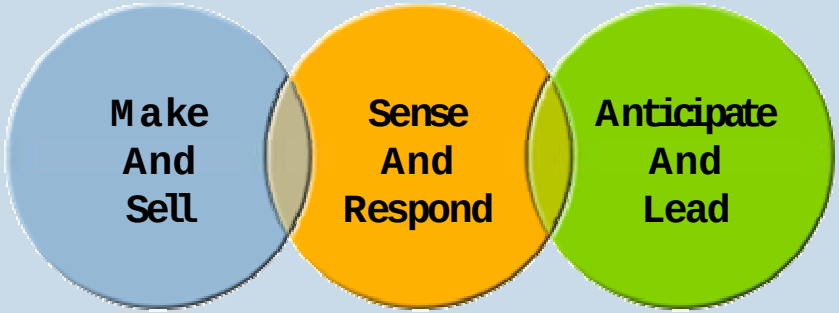
# Three traits of project management related to alternative business designs




## *Traits:*

- *Complexity*
- *Uncertainty*
- *Risk*

# An example of the Business Design Effect..

| Trait | Make-and-Sell | Sense-and-Respond | Anticipate-and-Lead |
|---|---|---|---|
| **Complexity** Function of number of elements and relationships | • Minimal Complexity<br>• Learning Curve<br>• Limited change<br>• Elements & Relationships are known. | • High, limited learning curve<br>• Objective may change | • You define the world<br>• Objective and requirements are clear<br>• Limited learning curve |

# An example of the Business Design Effect..

| Trait | Make-and-Sell | Sense-and-Respond | Anticipate-and-Lead |
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| **Uncertainty Function of complexity and time** | Low or Standard project uncertainty. Goal is to optimize project | High Uncertainty. Objective may even change over time | High Uncertainty. Goal is known but path to goal is not |

# An example of the Business Design Effect..

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| **Risk**<br>**Function of Uncertainty of consequences** | Traditional Standard project risk. Possibility of solving the wrong problem raises risk level significantly | Requirement may change. Increased time pressure increases risk. | Project Risk could be high since new destination provides limited learning curve advantage. |

Relevance to Project Risk Management

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# Error Types (new)

## Type IV Error

Attempting to solve an ill-defined problem set in an highly uncertain environment, while acting as if the problem was clear and the environment surrounding the problem was understood.

# Questions?