



**A
GREAT
DECISION
EVERY TIME!**

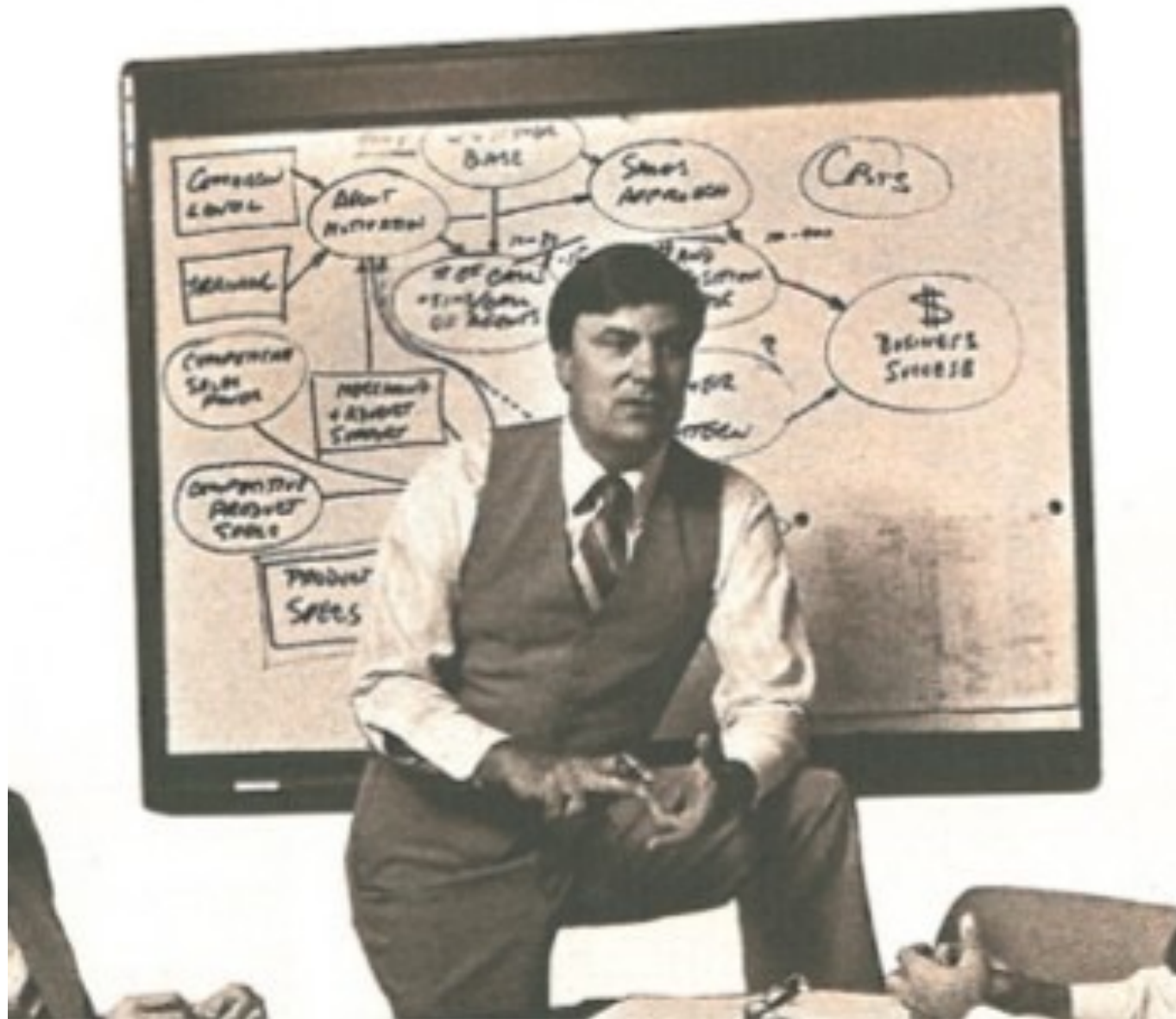


THE FUNDAMENTALS OF DQ AND HOW DID WE GET HERE?

Carl Spetzler, Chairman Strategic Decisions Group

Conference of the Society of Decision Professionals
April 16, 2024

This presentation is largely built on an internal webinar at the occasion of the 40th anniversary of SDG.

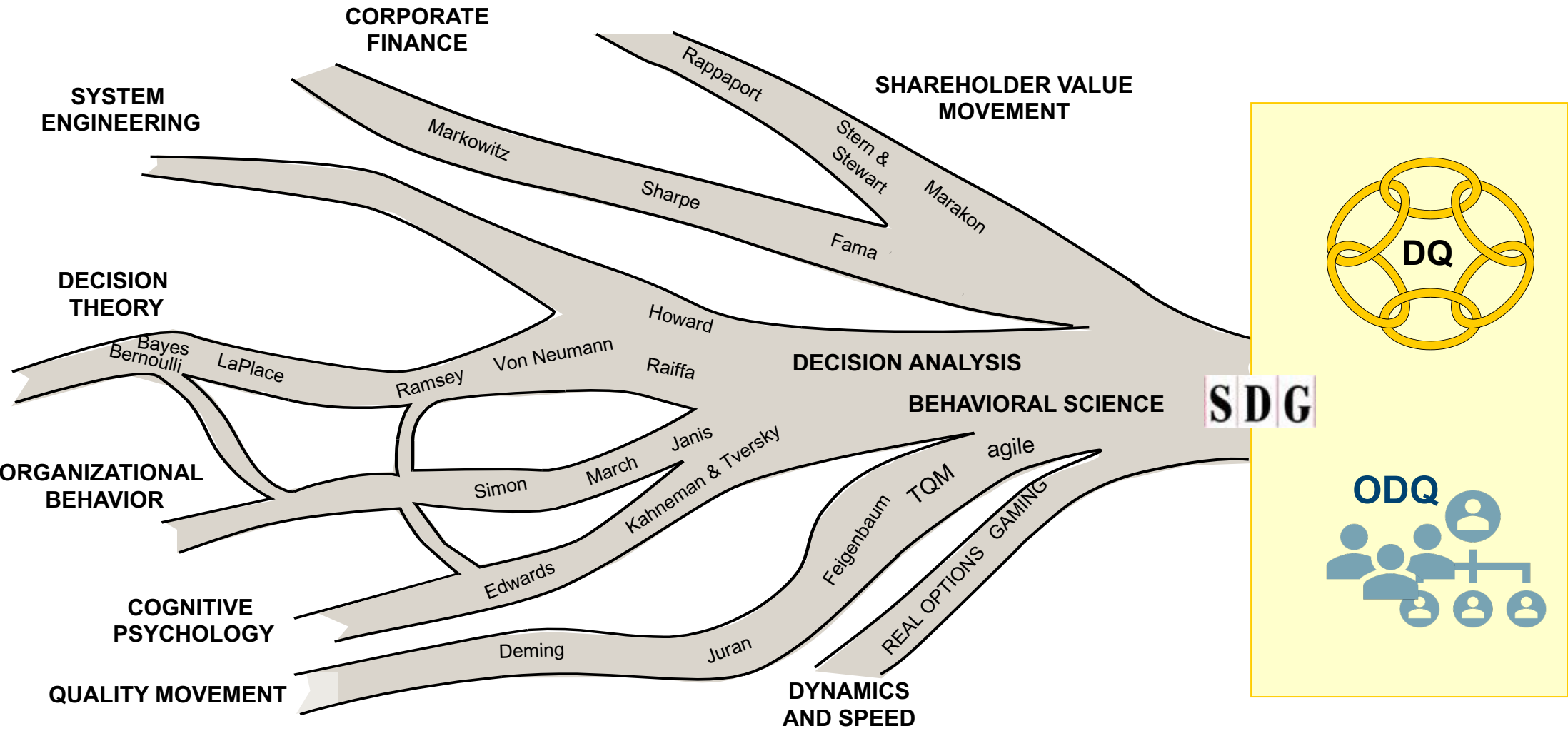


SDG 1981

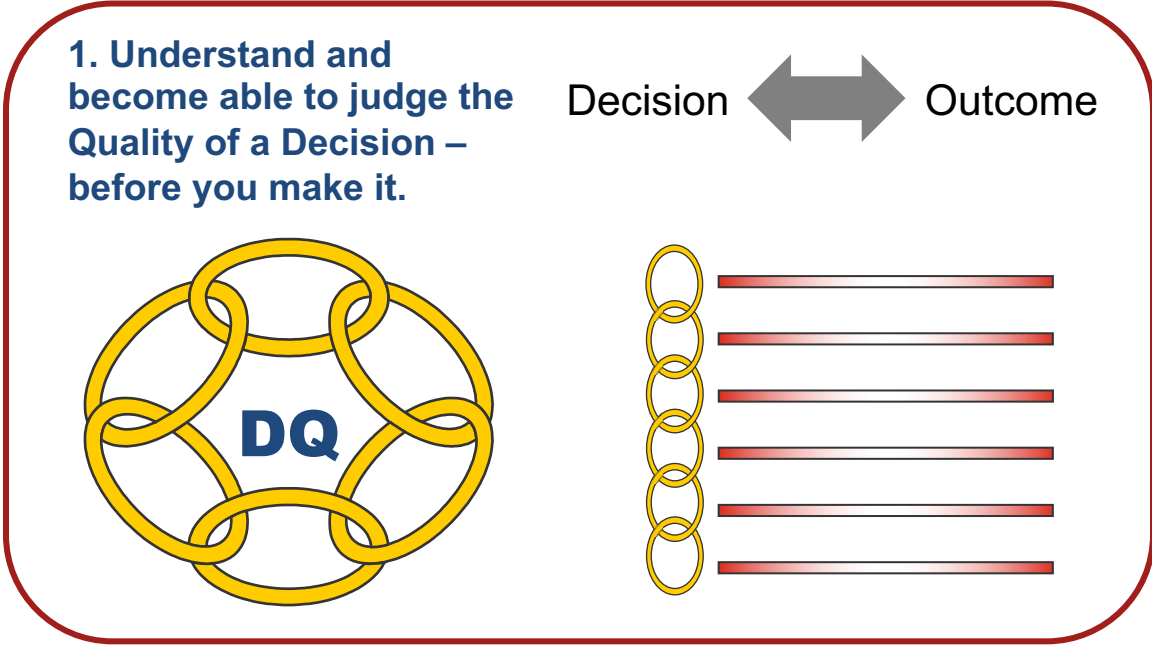
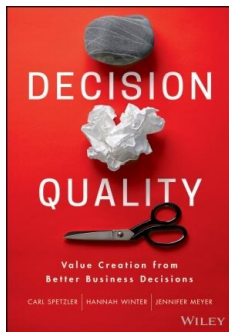
Agenda

- > **What is the field today**
- > DA in the early days – SRI International to SDG – expanding applications of DA
- > DQ – from 1985
- > ODQ – from 1990
- > ODQ at Chevron and the ROI of DQ (excerpt from a presentation to Chevron in 2011)
- > Continuing thought leadership

We stand on the shoulders of Giants. The DQ and ODQ frameworks were built by thought leaders over centuries.



The full DQ Framework is covered in the book



2. Learn how to diagnose a decision situation and how to select a decision process that drives to Decision Quality.

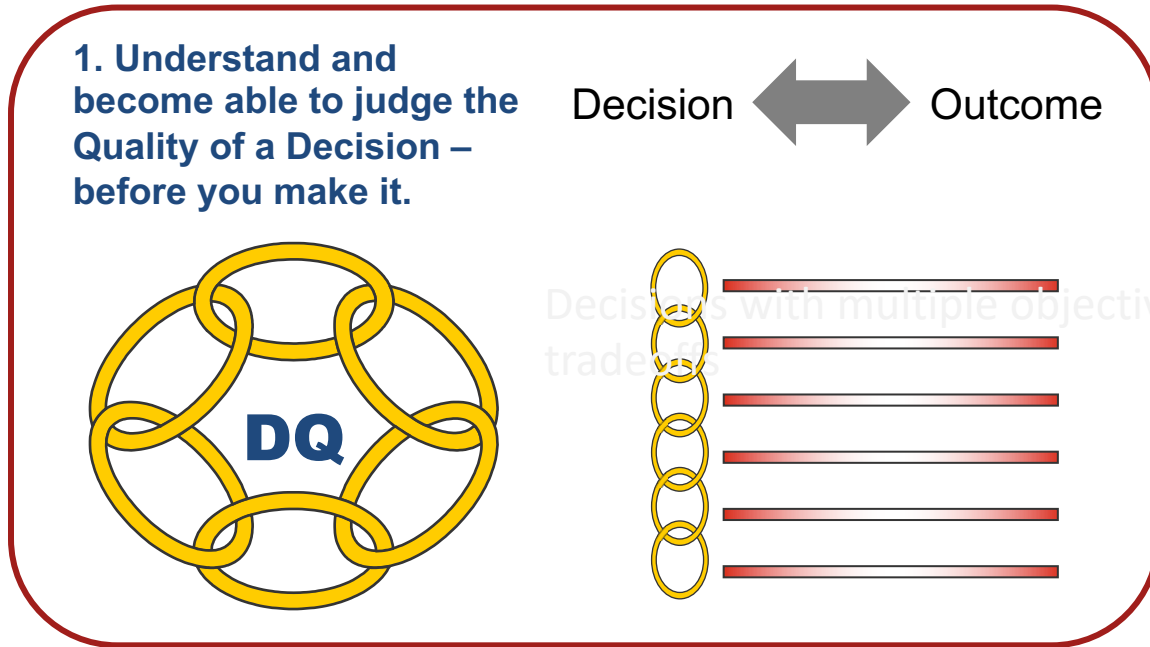
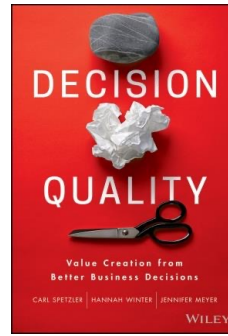
What is the nature of this decision?

3. Avoid biases, decision traps and mega-biases

4. Become familiar with the most useful tools and displays for decision making.

5. Organizational DQ (ODQ) – Governance processes, roles and responsibilities, delegation/escalation, training and capability building and developing a healthy decision culture.

“To the many DQ champions who share our passion for making the common sense of decision quality truly common.”



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What is the nature of this decision?

Decision Board

Project Team

3. Avoid biases, decision traps and mega-biases

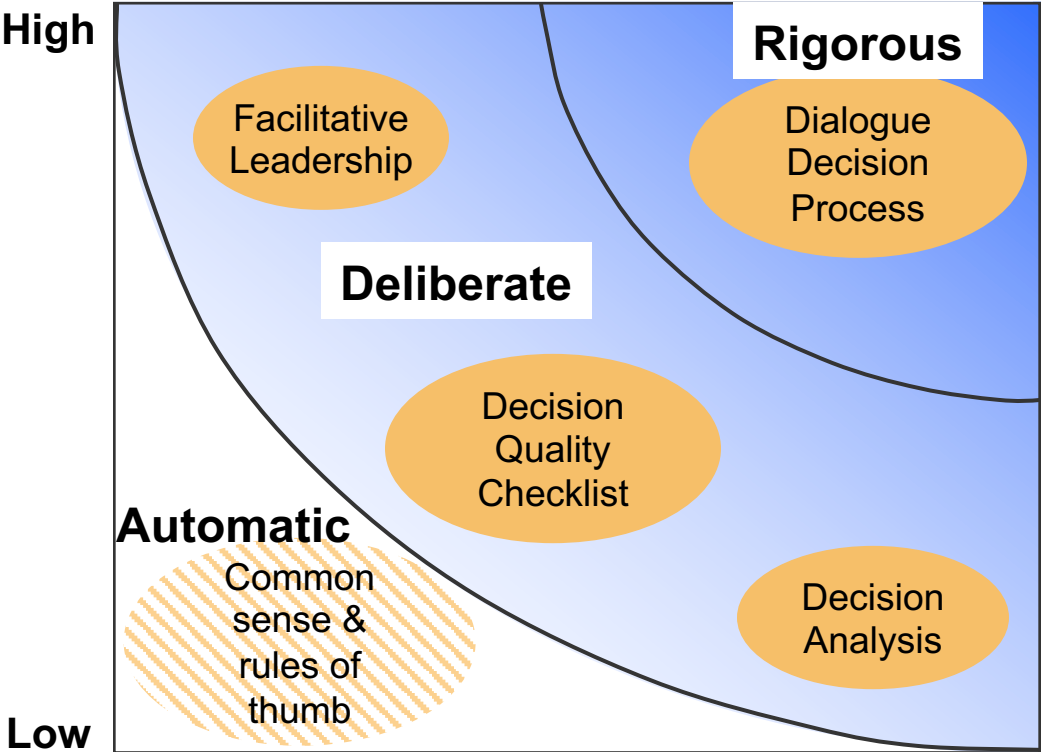
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5. Organizational DQ (ODQ) – Governance processes, roles and responsibilities, delegation/escalation, training and capability building and developing a healthy decision culture.

Today, Decision Professionals tackle organizationally and analytically complex decision situations with confidence and lead ODQ transformations.

Organizational Complexity

- Many parties in conflict
- Individual and organizational differences in:
 - Values, desires, and motivation
 - Initial convictions
 - Fundamentally different frames
 - Personalities and competencies
 - Degrees of power and resource availability
- Group dynamics—human nature in groups



Low Analytical Complexity High

- Uncertainty
- Dynamics; Options
- Many interrelated important variables

- Many alternatives
- Multiple interrelated decision criteria
- Multiple players in competition—gaming

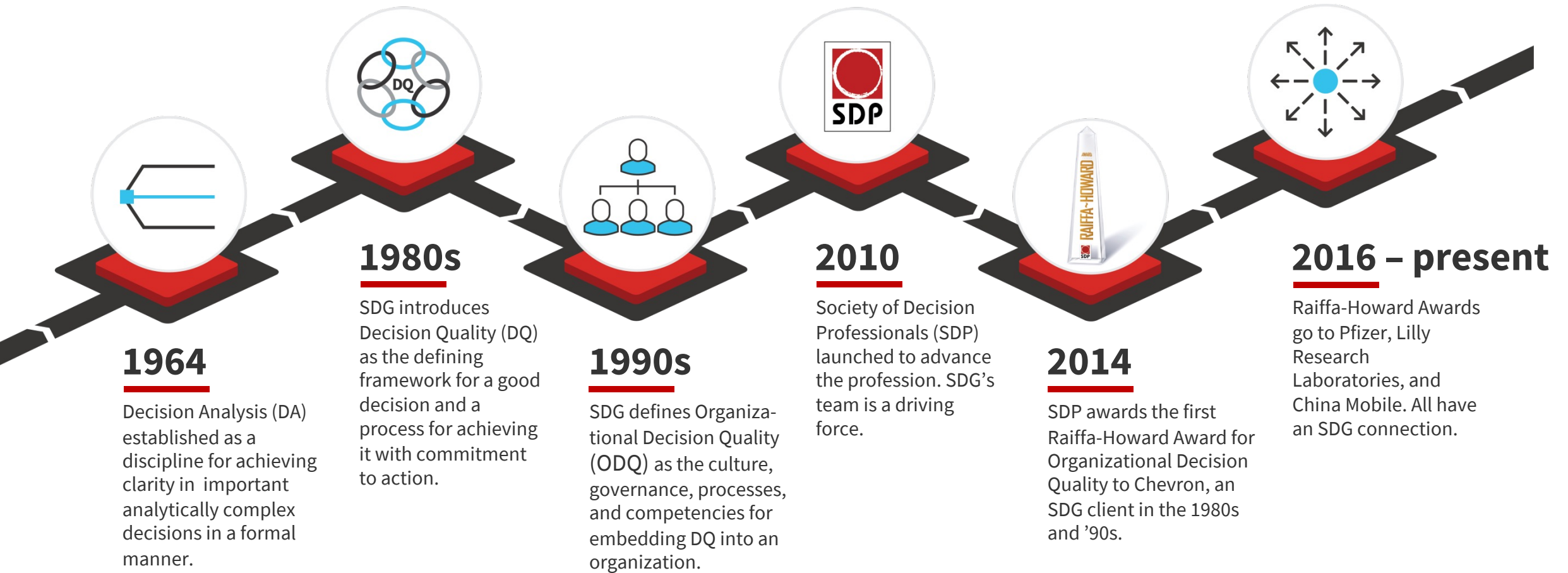
We apply a large body of explicit knowledge organized into 3 levels.

<p>Tools</p>	<p>DQ Spider Snake Tornado Strategy tables Business Success Templates Convergence/Commoditization (CC) maps Value and risk maps Real options valuation Value Tracking Templates Modeling tools -- ModelBuilder Linear Risk Tolerance Risk Profiles Dysfunctional Decision Behavior assessments</p>	<p>Certain Equivalent (CE) Quantification of the Value of Information Waterfall diagrams Efficient Frontier Decision Trees and Influence Diagrams Game and negotiation trees Monte Carlo simulation Decision templates Information pedigrees Market-based risk pricing Time staged framing Organizational IQ test Linkage of Chains and snakes</p>
<p>Best Practice Methodology</p>	<p>End-to-end best process for maximum value creation Best and timely decisions With best and timely execution Dialogue Decision process for Strategic Decisions Strategic Enterprise Risk Management Portfolio Optimization Process Value Tracking; Lookbacks Portfolio Value Tracking Organizational congruence model Facilitation practices & distance collaboration High performance teams and team leadership Organizational Learning Model Incremental learning Transformational learning DA cycle Information encoding methodology</p>	<p>Dynamic and probabilistic modeling Financial modeling Market Modeling Creativity methods & Design Thinking Value metrics Distinctions among value delivery metrics and value creation metrics Direct and indirect values Multi-criteria evaluation Decision alignment and empowerment Strategic Gaming and Negotiation Traditional Strategy Assessment Tools: Five forces; Value chains Remote collaboration and engagement methods and platforms R-H Award Assessment for ODQ</p>
<p>Theoretical Foundation</p>	<p>VBL – Value Based Leadership Systems Perspective Business Model Value Migration & Disruption Decision theory (including probability, utility theory, negotiation and game theory) Theory of Finance Aspects of the Total Quality Paradigm Definition of ODQ</p>	<p>Psychology of judgment and decisions Cognition Motivation Team and organizational behavior Conflict/agreement Group decisions Power and governance</p>

Specific situations require the appropriate selection from each level.

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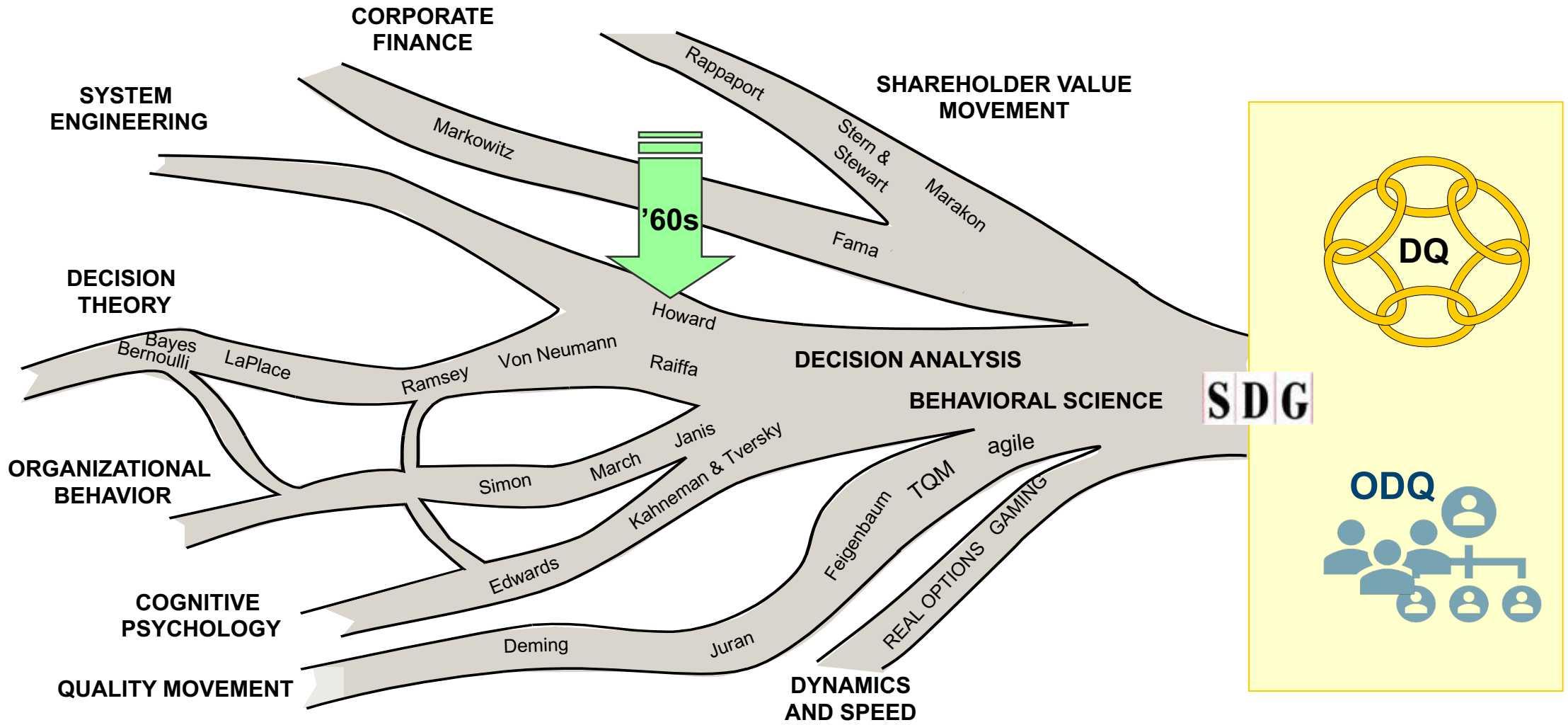
SDG has had a key role in advancing the profession for the last 40 years.



Agenda

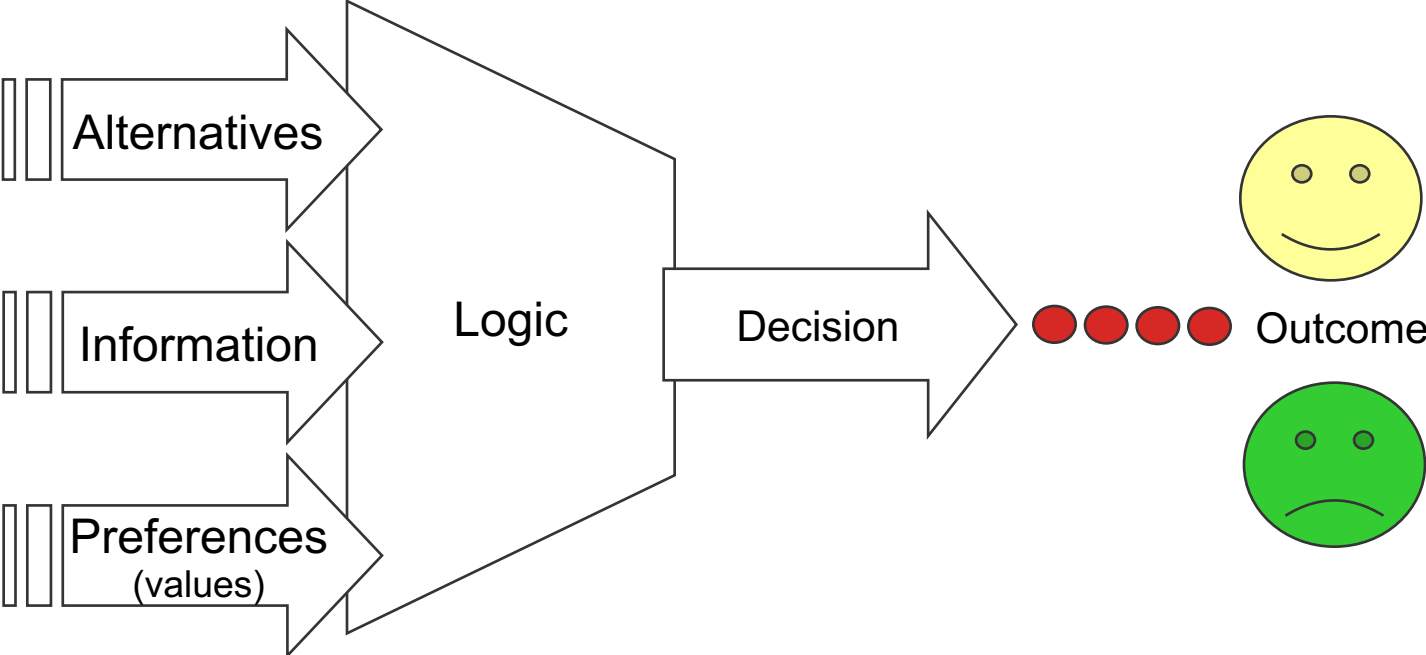
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In the '60s, Ron Howard combined a systems engineering approach with decision theory to solve real world problems.



In the '60s and early '70s, we defined a good decision as being logically consistent with our alternatives, information, and preferences.

We elicited (i.e., assessed, encoded) the decision basis

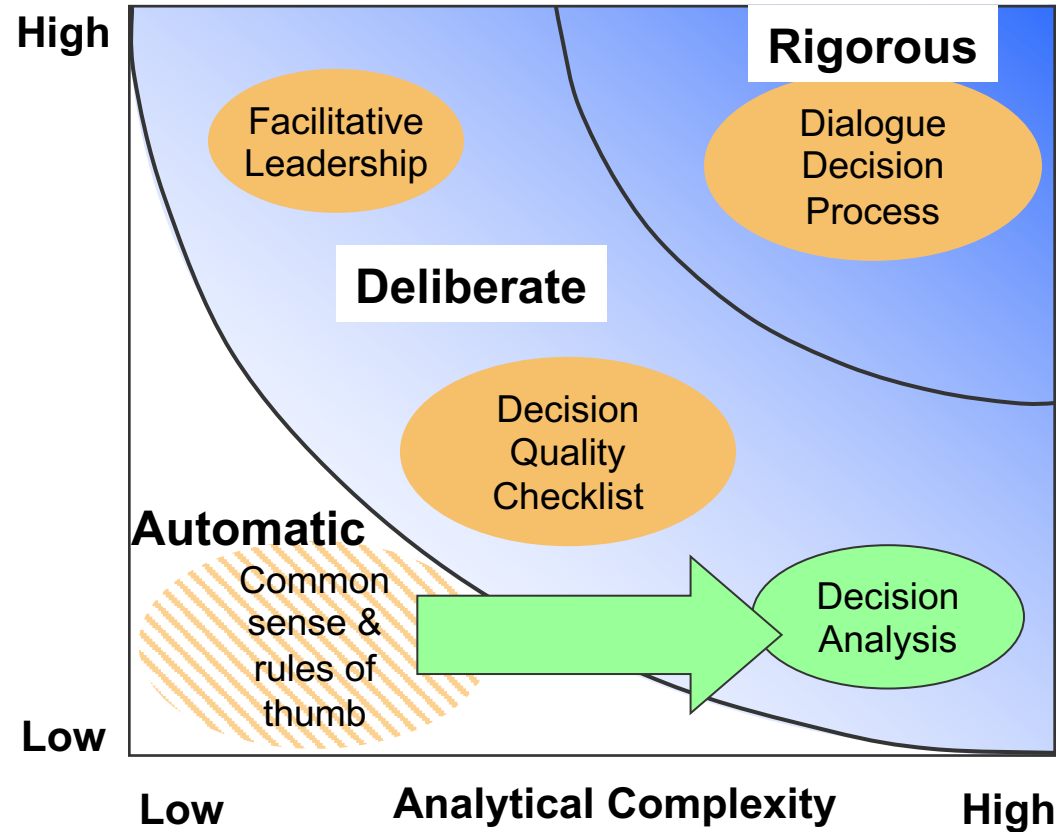


With the new insights from cognitive psychology, we began to improve the decision basis by de-biasing

Initially, we focused mostly on analytical complexity.

Organizational Complexity

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Ron Howard and Jim Matheson created the SRI Decision Analysis Group – as a “teaching hospital” in ’66. I (Carl Spetzler) joined in ’68.

- Applied Decision Theory
- DA Cycle
- Trees, Tornadoes (as lists)
- Probability encoding methodology
- Financial Models GE Timeshare Models that take 3 months to build
- Wow, we can solve significant decision problems
- We learn to be consultants and begin to serve top management
- The DA Group thrives until it runs into SRI institutional limitations



Teaching and executive seminars are already a part of the equation.

“If a man will begin with certainties he will end with doubts, but if he will be content to begin with doubts he shall end in certainties.”
— Francis Bacon (1561-1626)

Our product was reaching clarity in complex uncertain decision situations.

- I did my first DA application in '67 at Standard of Indiana → Amoco → BP
- Exxon R&D in house workshops
- Ed Capen became a disciple and innovator at Arco
- Many seminar attendees

GULF OIL: “The final chapter to the olefins plant case is that the decision analysis led us to change our minds. We had had preconceived notions. In the end, we decided to build a larger plant, to choose a different plant site, and to build a plant based on different feedstock. Even those in our midst who originally thought there was no need for decision analysis, agreed we came up with a much better decision using this approach.

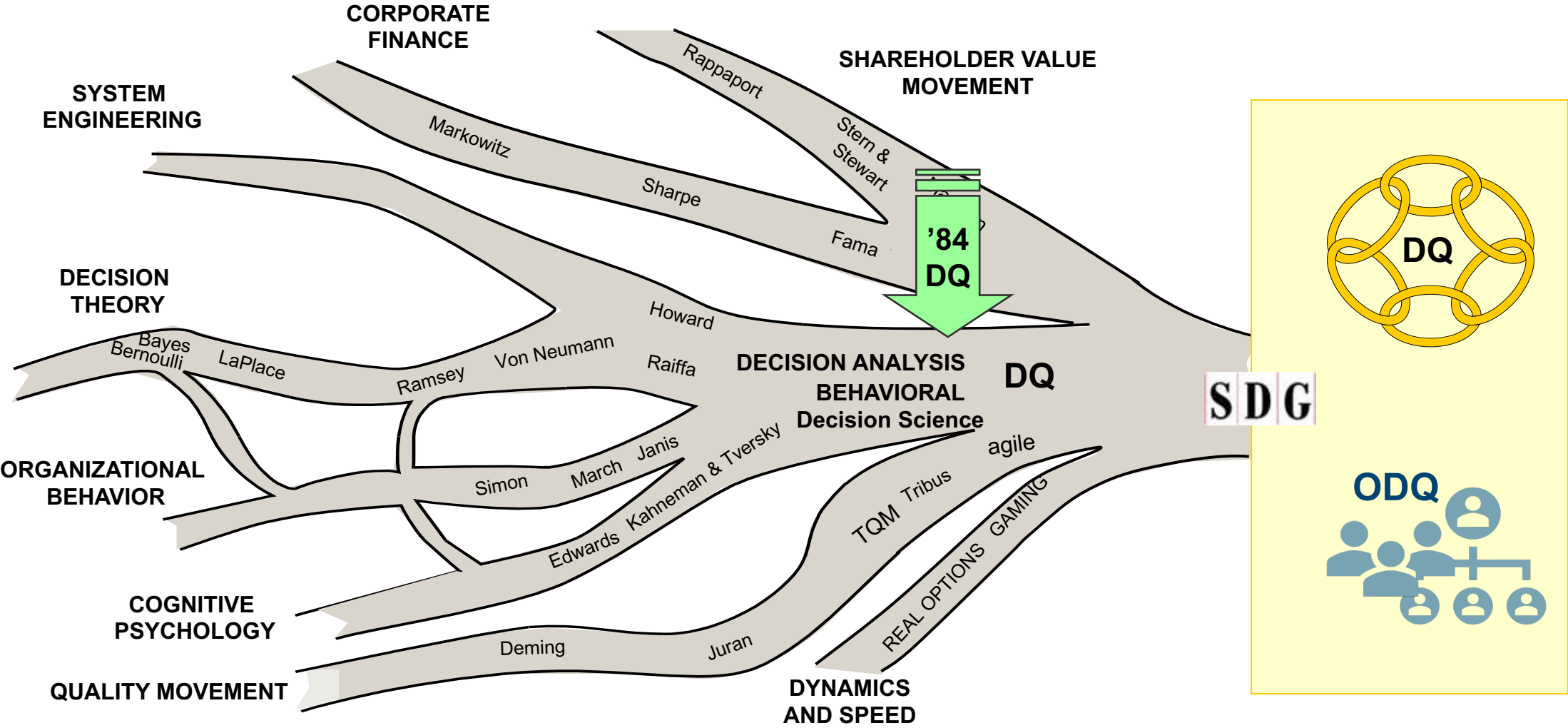
We had begun in doubt ... with the help of decision analysis, we ended in certainty – the certainty of having made a good decision. Thus, if you feel as I do that good decisions are more often than not followed by good outcomes, you should not hesitate to use decision analysis where the outcome is important.”

—William C. Roher, President, Gulf Oil Chemicals Company (March 9, 1977)

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In the early '80s, we created DQ in response to the Total Quality Management (TQM) movement resulting in the DQ paradigm.

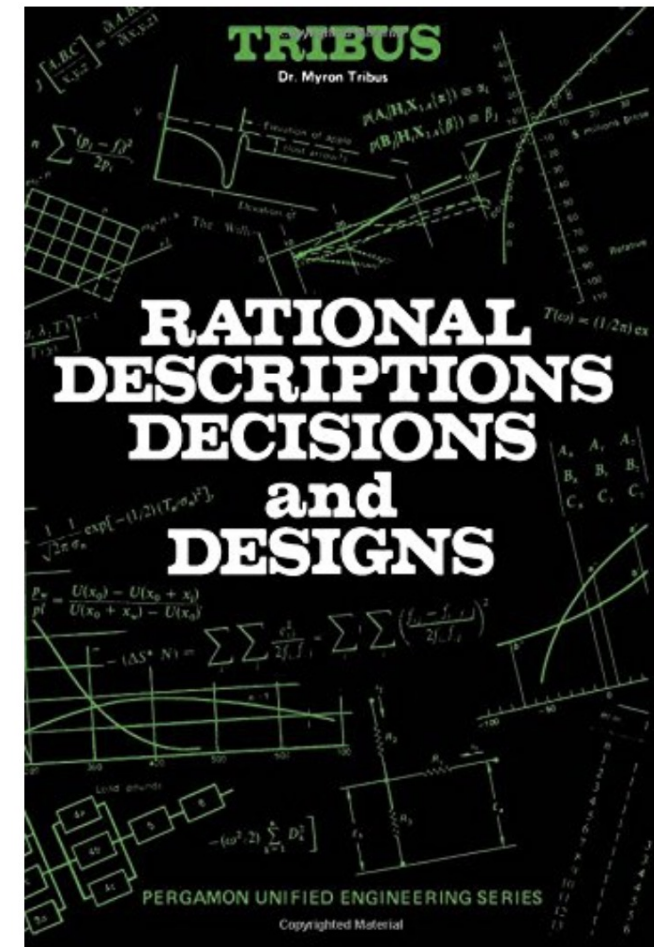


Myron Tribus was a strong advocate and great customer of DA. Then he became a convert and advocate of Deming.

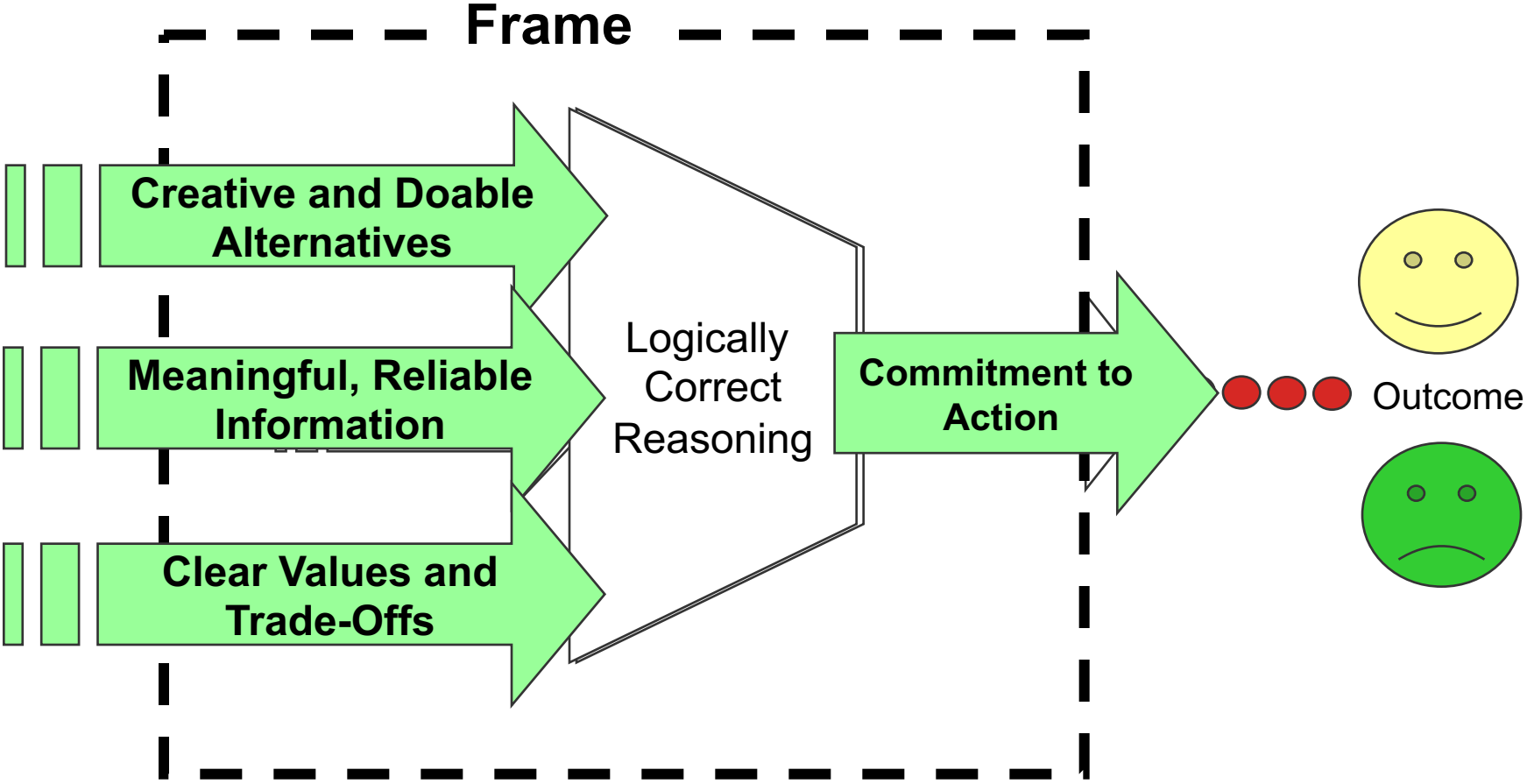
This led us to reconsider our DA paradigm.

- The Japanese are winning due to TQM – Deming was their inspiration
- Strategy is Dead! Walter Kiechel III
- The customer is always right
- “Carl you aren’t answering my question! I want to know what **you** think?”
- “You guys are very good Decision Analysts, but you just aren’t good consultants.”

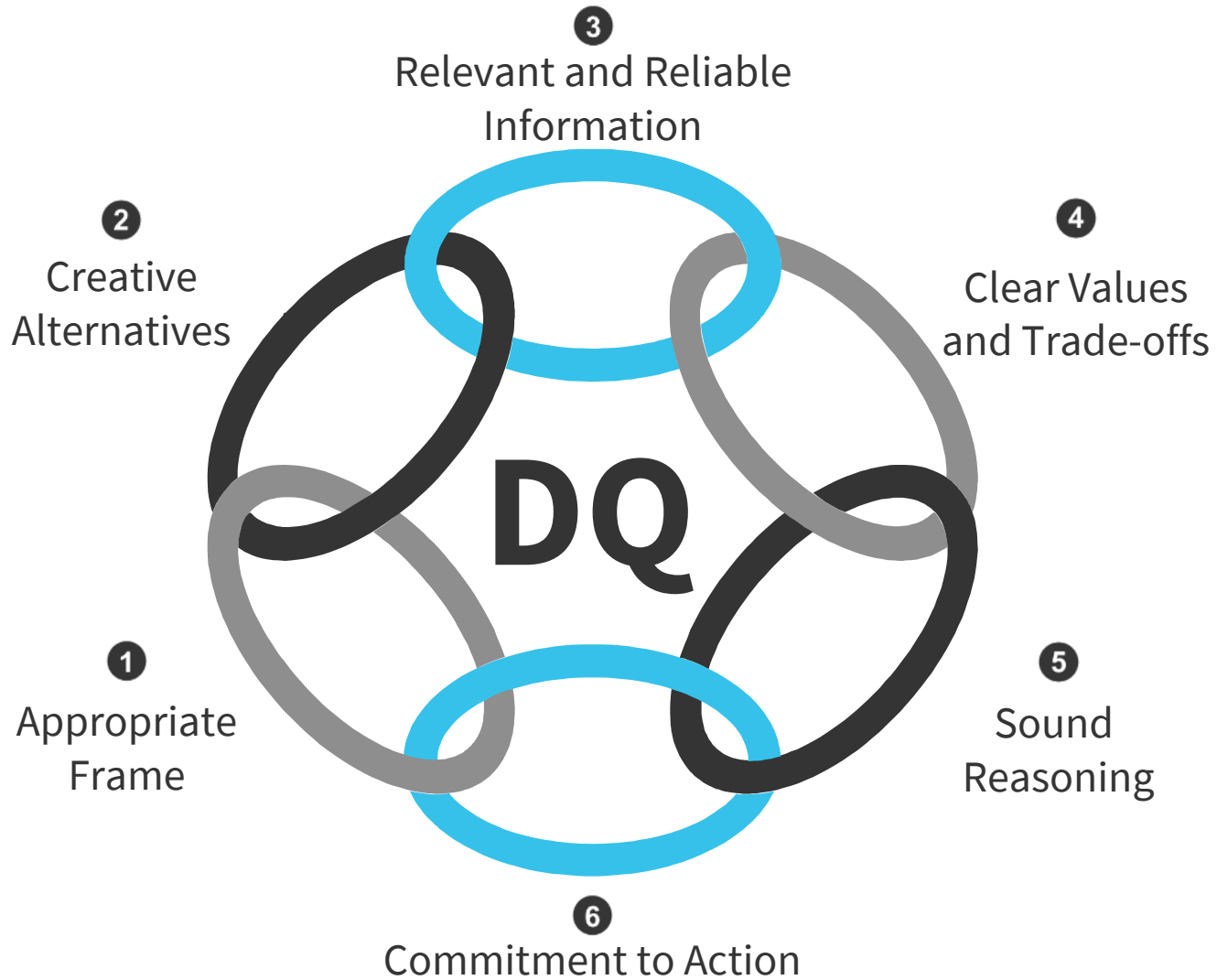
The result was a paradigm shift from DA to DQ



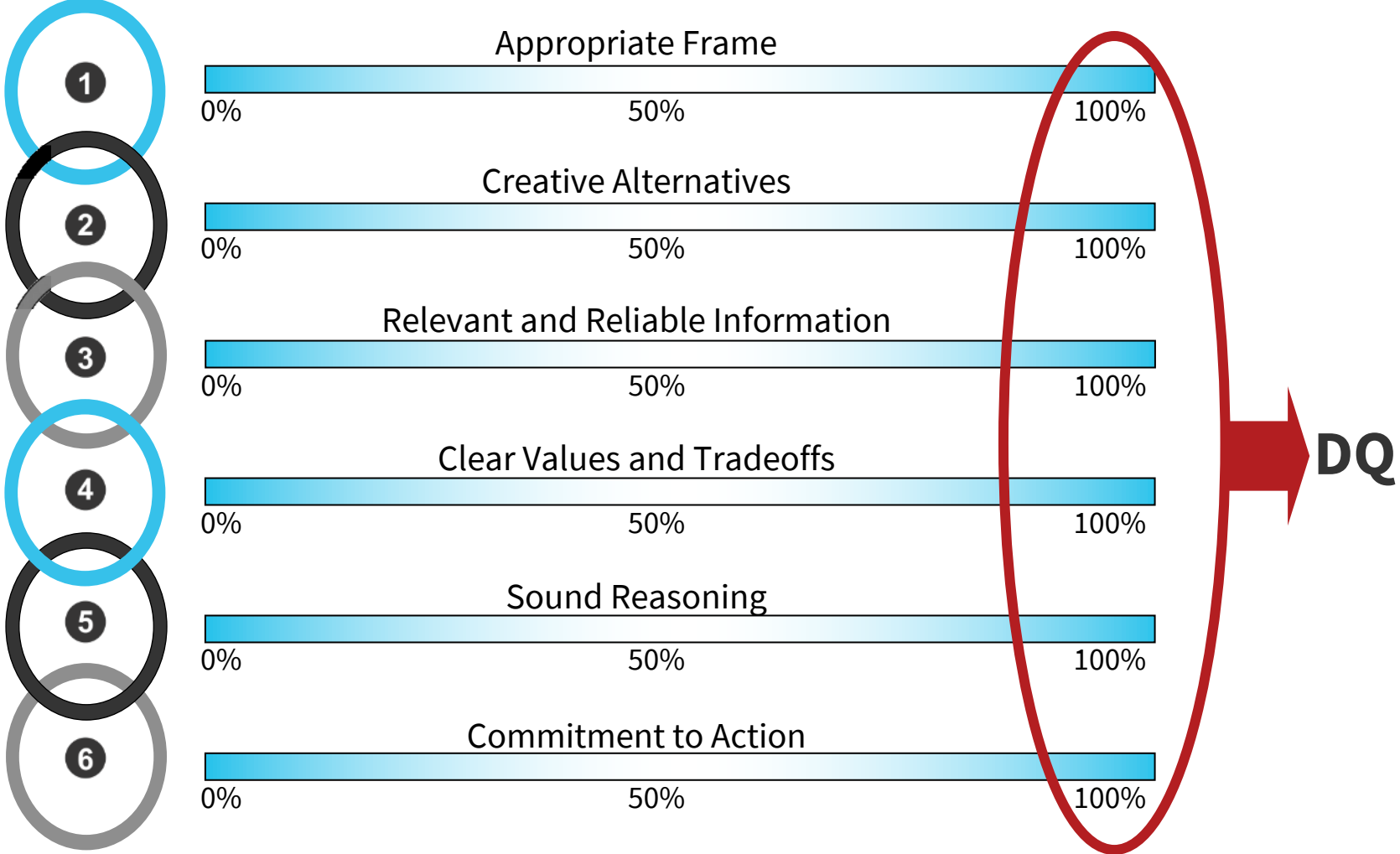
We added quality in the decision basis, framing, and commitment to action.



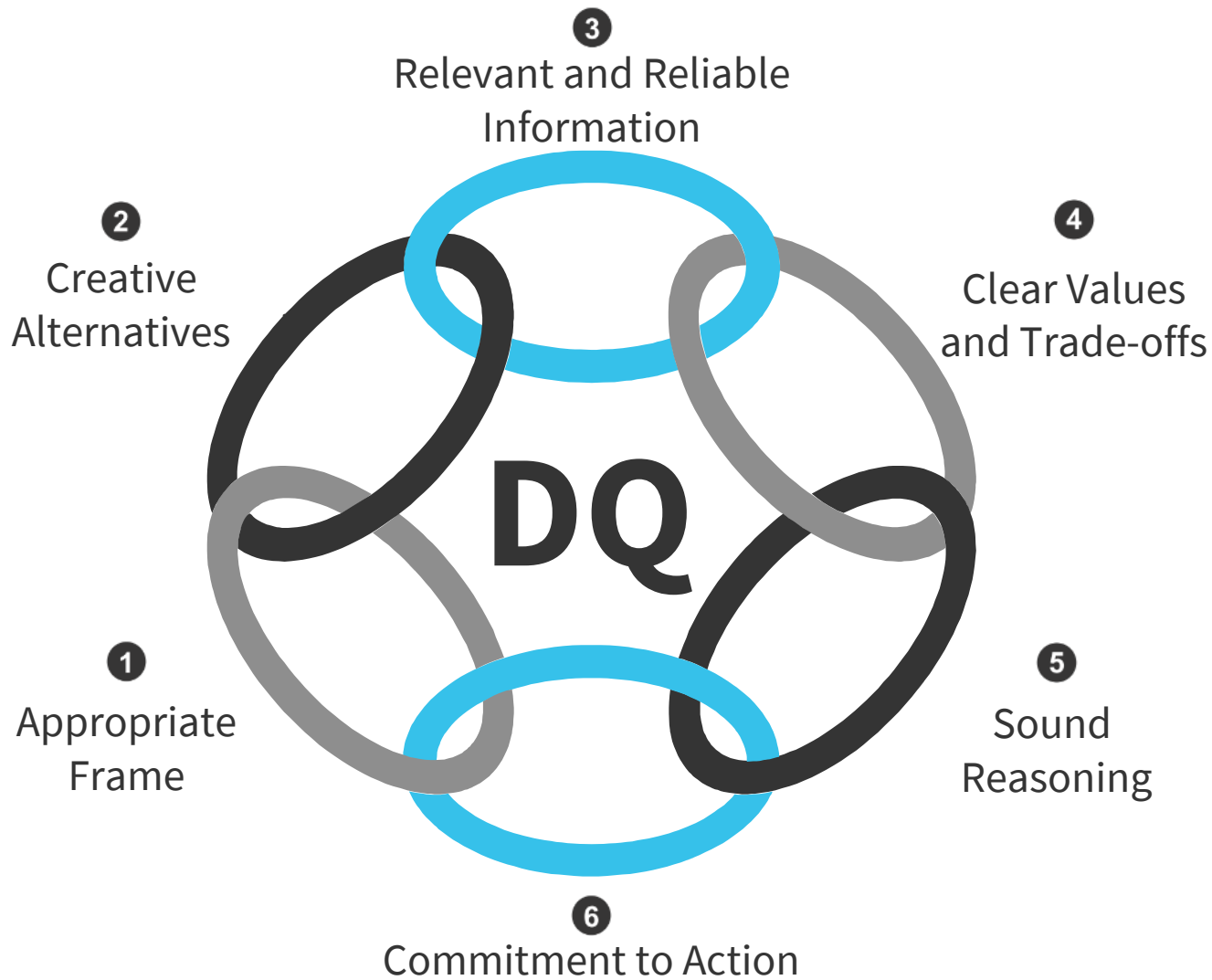
To reach DQ, we must meet six requirements.



When it is not worth additional effort or delay to improve quality, we have reached 100%.



To reach DQ, we must meet six requirements.



How would you rate the quality of this decision?										
APPROPRIATE FRAME										
0	1	2	3	4	5	6	7	8	9	10
<ul style="list-style-type: none"> Wrong people Wrong perspective Plunging in Lack of focus Too broad or narrow scope 				Gaps to fill:			<ul style="list-style-type: none"> We are focusing on the right decision(s) with a clear purpose, appropriate scope, and a conscious perspective <ul style="list-style-type: none"> With the right people In the right way 			
CREATIVE ALTERNATIVES										
0	1	2	3	4	5	6	7	8	9	10
<ul style="list-style-type: none"> No alternatives Delusion on what's feasible In the comfort zone Missing great alternatives 				Gaps to fill:			3-5 Alternatives <ul style="list-style-type: none"> Creative stretch Truly doable Significantly different: mild to wild Comprehensive Compelling 			
RELEVANT & RELIABLE INFORMATION										
0	1	2	3	4	5	6	7	8	9	10
<ul style="list-style-type: none"> Focus on what we know Ignoring uncertainty Ignoring intangibles Biases Missing interdependencies 				Gaps to fill:			Forward looking <ul style="list-style-type: none"> Material to decision; primary value drivers Based on appropriate data and judgments; unbiased Includes uncertainty; possibilities with probabilities 			
CLEAR VALUES AND TRADEOFFS										
0	1	2	3	4	5	6	7	8	9	10
<ul style="list-style-type: none"> Neglecting key stakeholders Lack of clarity and communication Ignoring intangibles Double-counting risk 				Gaps to fill:			Focus on value creation <ul style="list-style-type: none"> Explicit decision metrics Consistent, conscious tradeoffs among multiple decision criteria Appropriate time preference & risk appetite 			
SOUND REASONING										
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<ul style="list-style-type: none"> Incorrect logic Get mired in detail and complexity Ignore uncertainty Rely solely on instinct and intuition 				Gaps to fill:			Appropriate Rigor <ul style="list-style-type: none"> Address uncertainty Correct decision logic Cut through complexity Achieve clarity of choice 			
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<ul style="list-style-type: none"> Premature action Postponing conflict Lack of ownership by implementers Underfund the action plan 				Gaps to fill:			Build true commitment during the decision effort <ul style="list-style-type: none"> Commit the resources Resolve conflicts – close ranks Create execution readiness with action plan 			

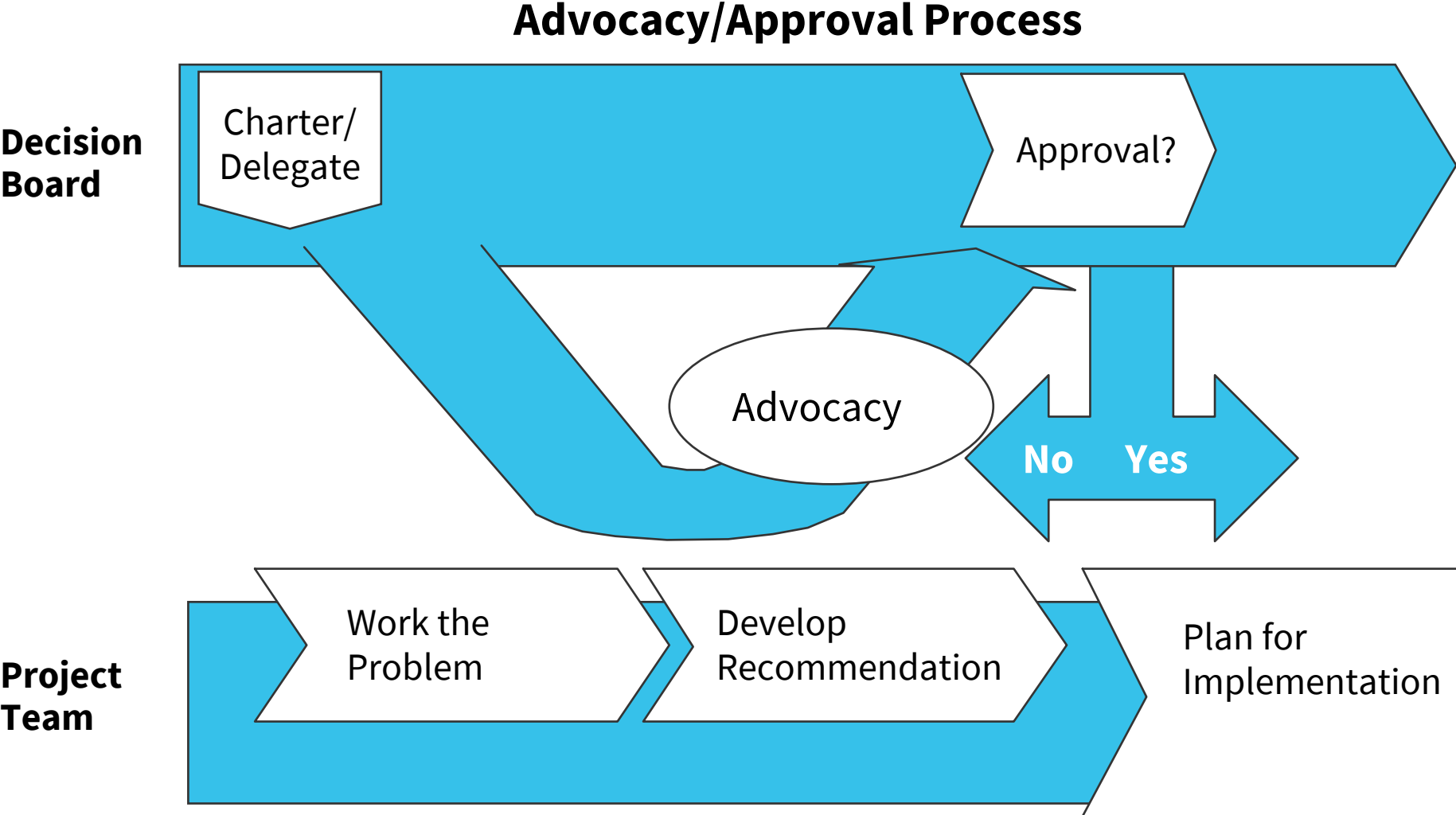
As a decision maker, we have to know how to judge the state of each DQ requirement.



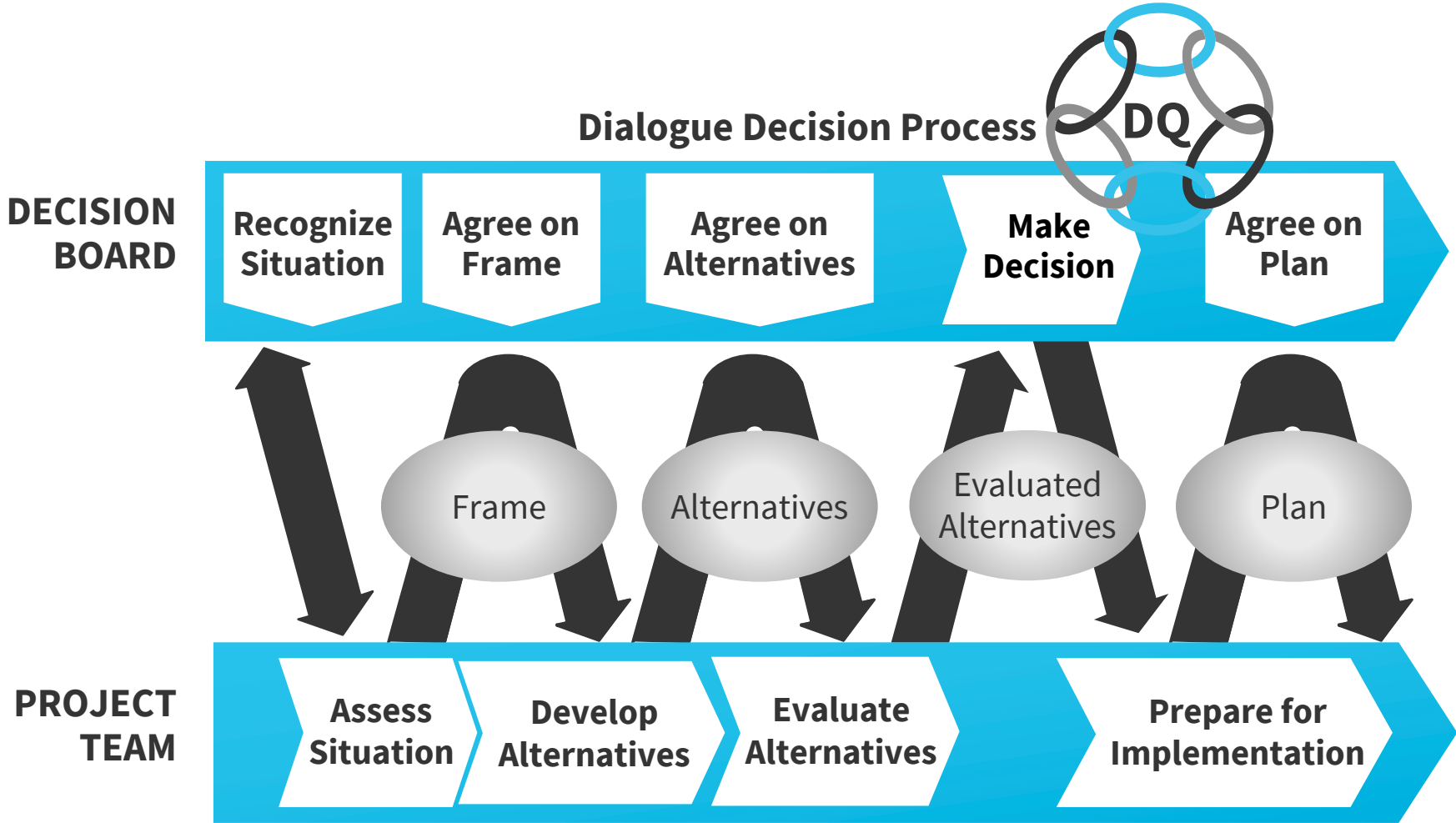
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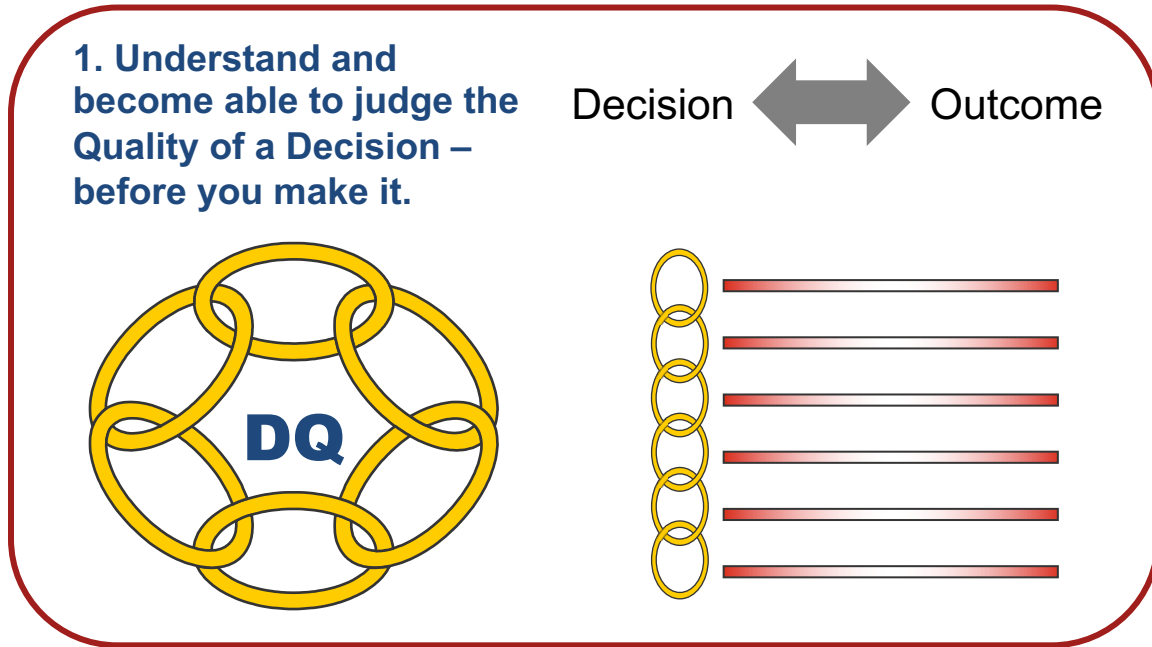
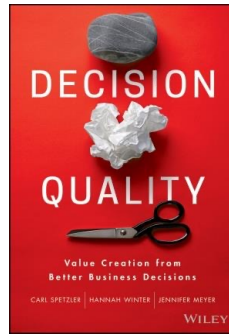
The typical advocacy/approval process does not generate DQ.



In contrast to the advocacy/approval process, a DDP is a collaborative search for DQ → maximum value.



“To the many DQ champions who share our passion for making the common sense of decision quality truly common.”



2. Learn how to diagnose a decision situation and how to select a decision process that drives to Decision Quality.

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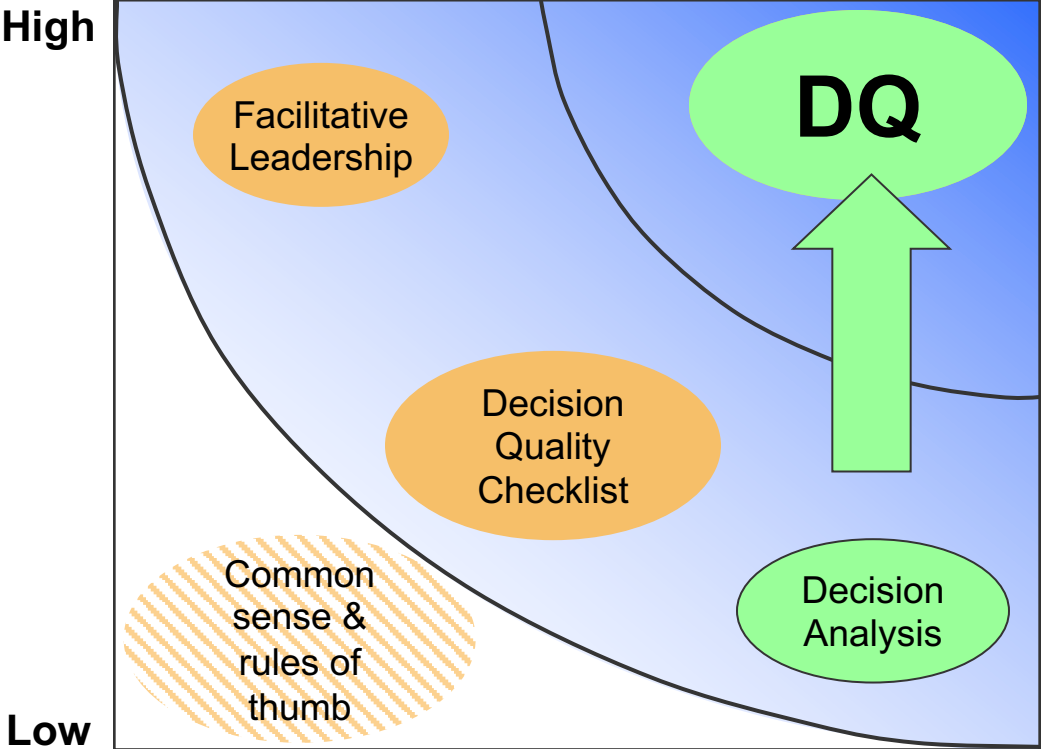
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5. Organizational DQ (ODQ) – Governance processes, roles and responsibilities, delegation/escalation, training and capability building and developing a healthy decision culture.

We integrated organizational behavior and decision facilitation.

Organizational Complexity

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We addressed broader and more complex solutions.

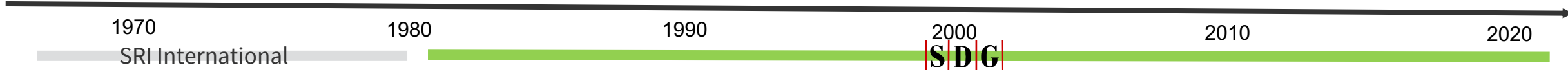
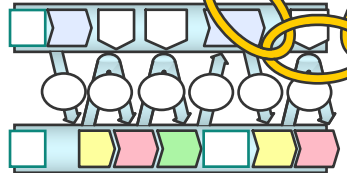
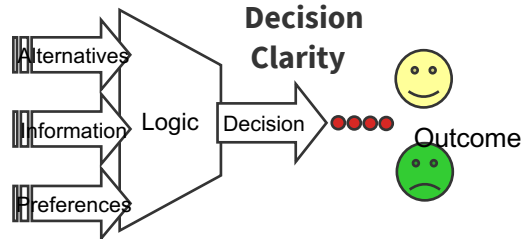


**Corporate Strategy /
Corporate Portfolio Strategy**

**Decision Process Transformation
Capability Development**

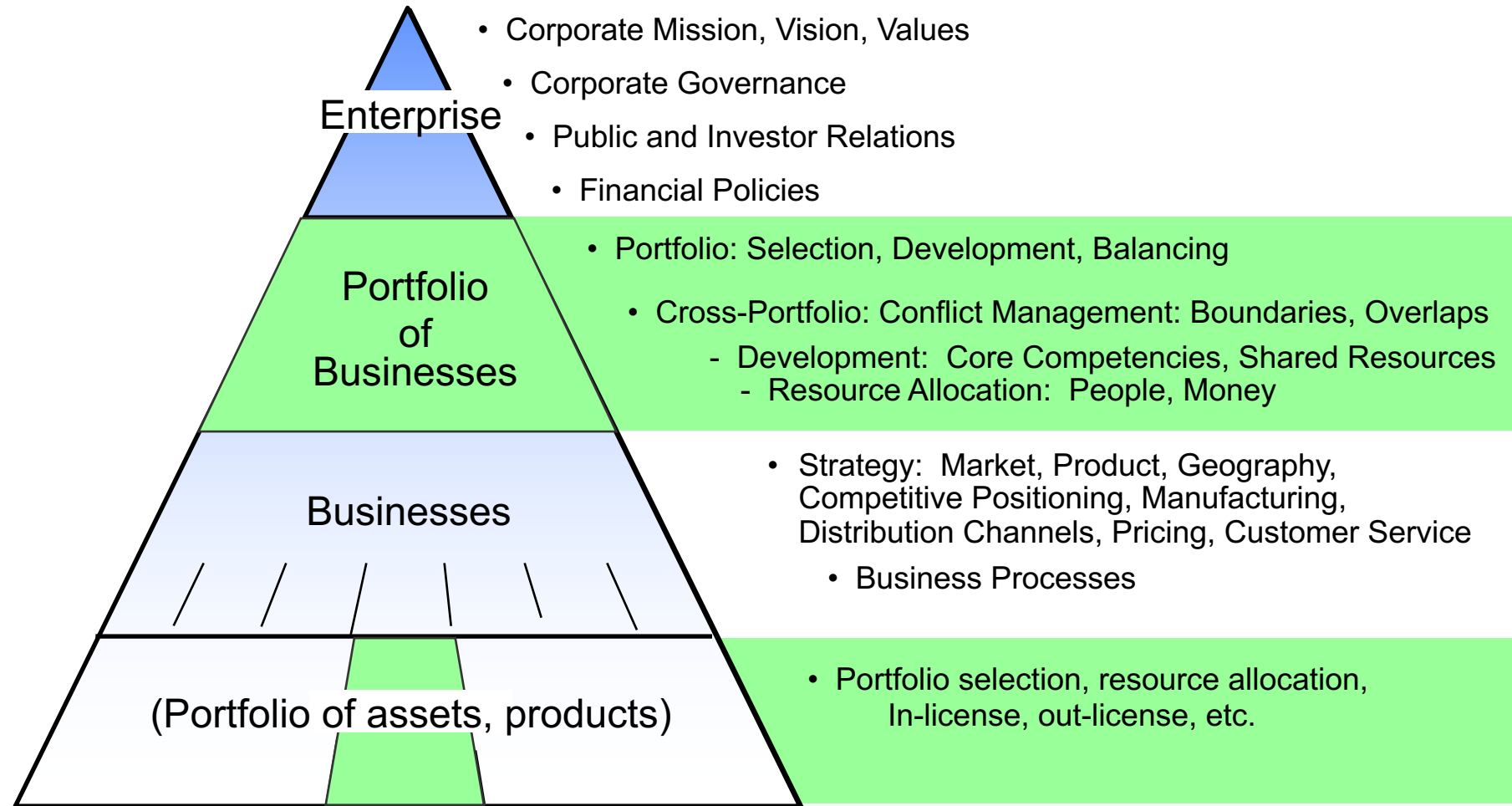
**Asset / Technology
Portfolio Strategy**

**Asset Strategy
& Valuation**

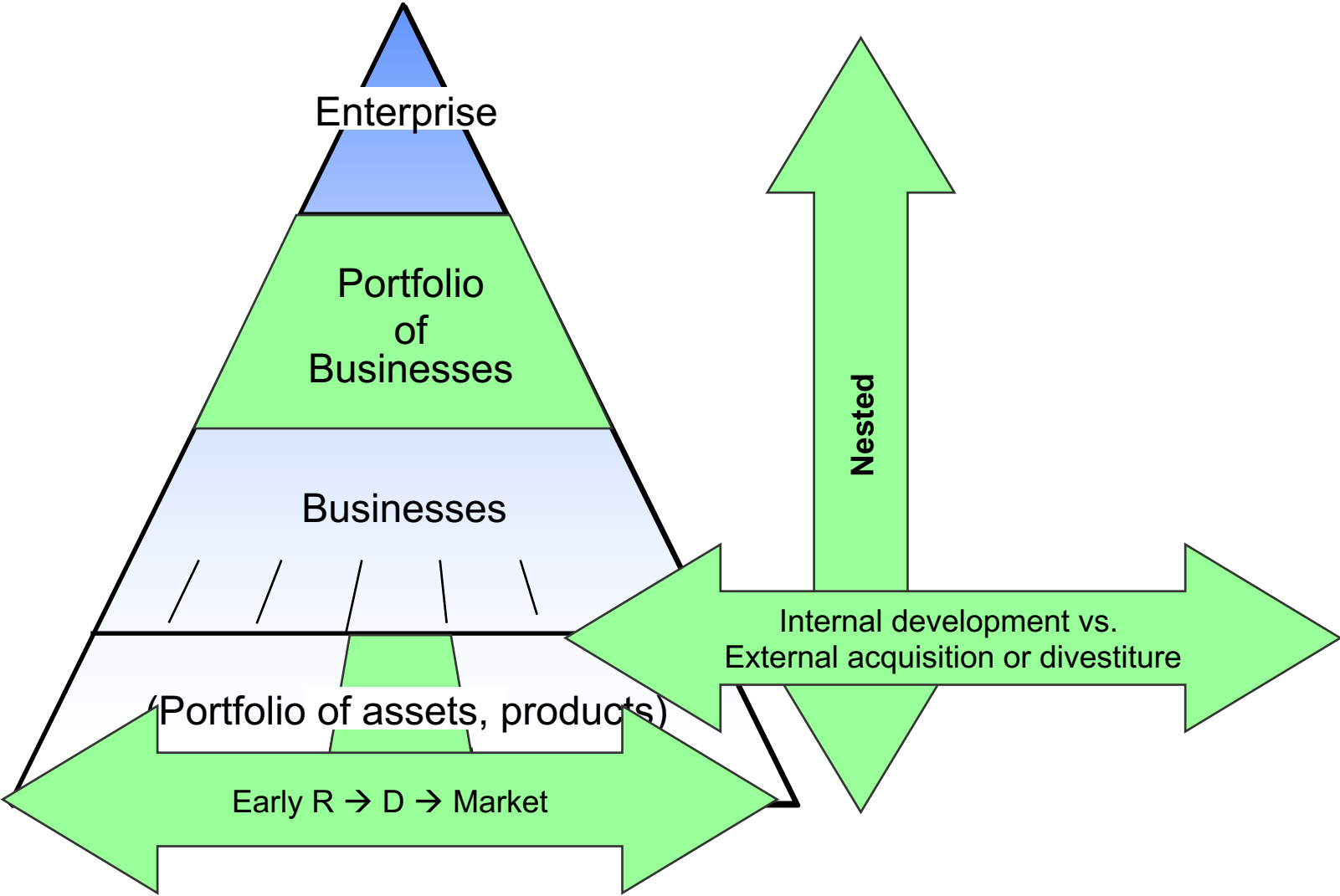


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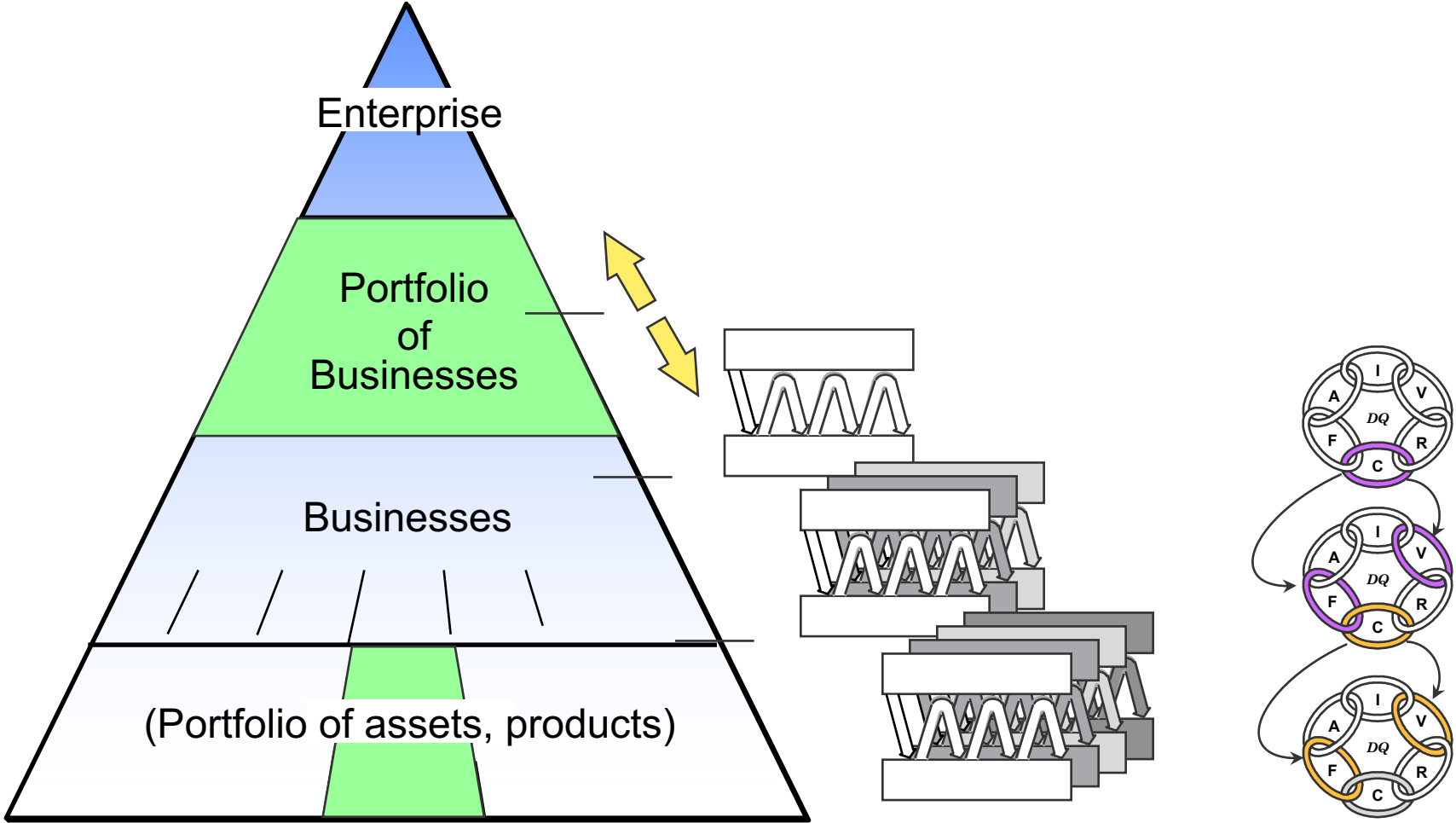
Decisions alternate as one-off strategy and portfolios.



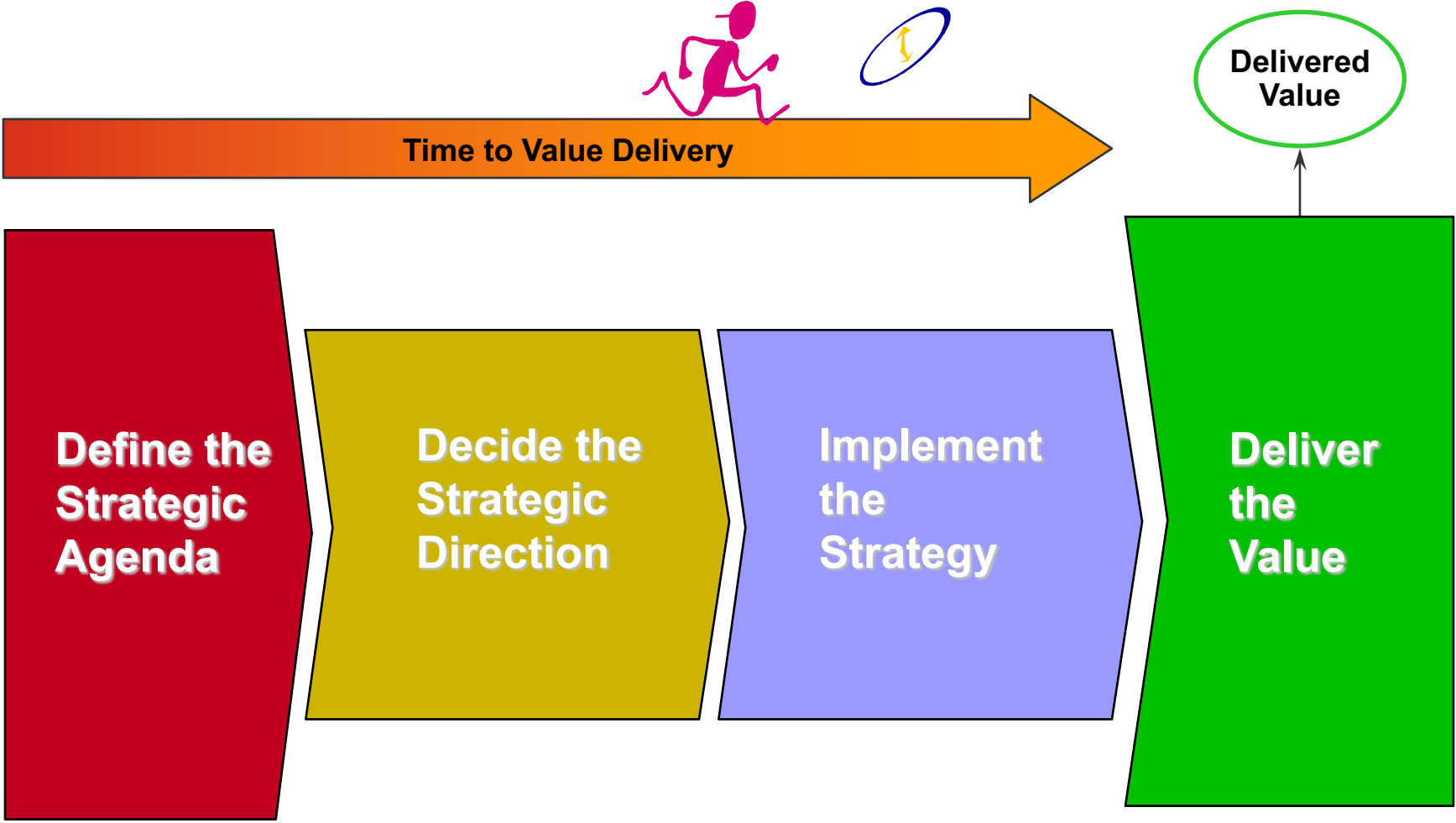
The decision domains are nested and interconnected.



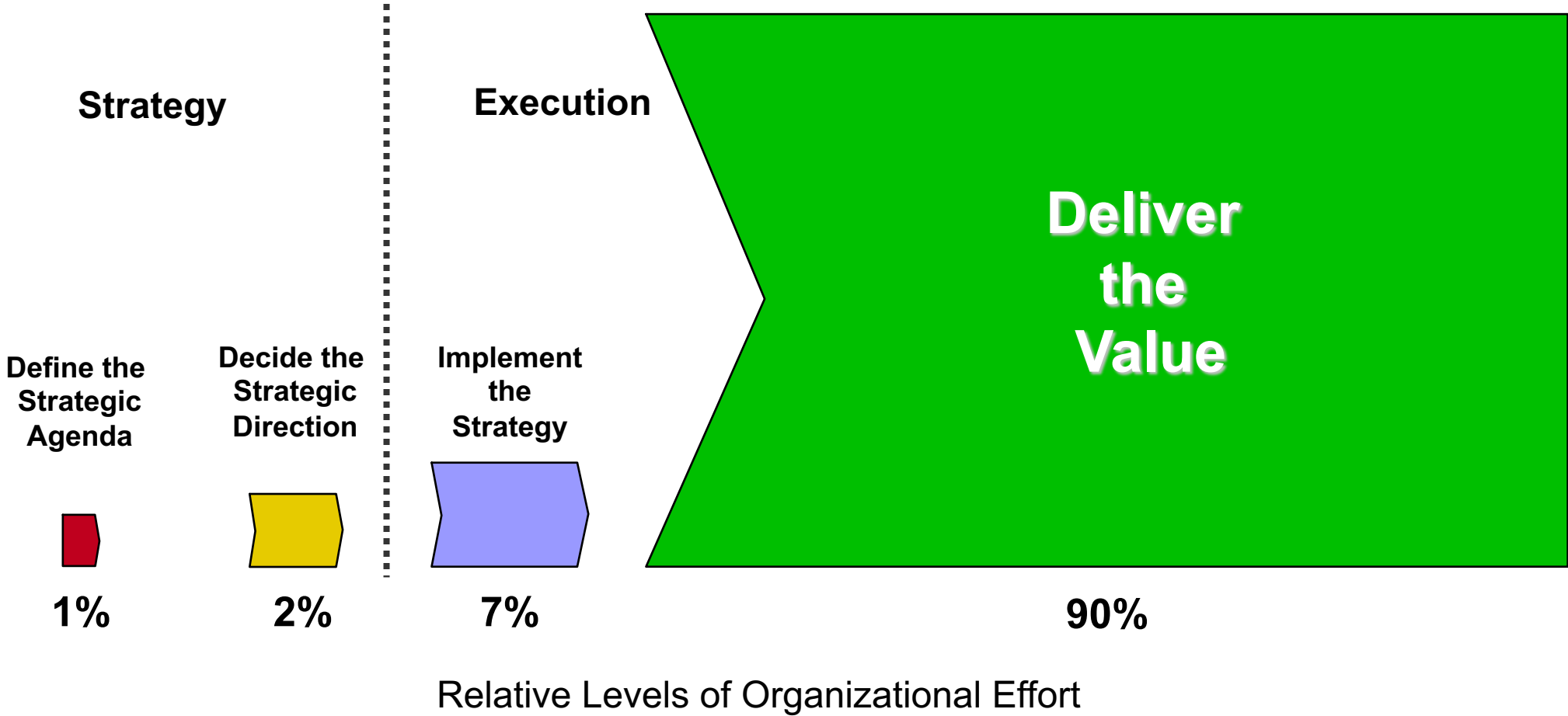
Each decision domain does not stand alone – frames and values need to be aligned.



The strategic leadership challenge: Win the race to create the most value in the shortest time – again and again.



In business, the overwhelming proportion of effort is spent in “execution” mode to realize value.



Agenda

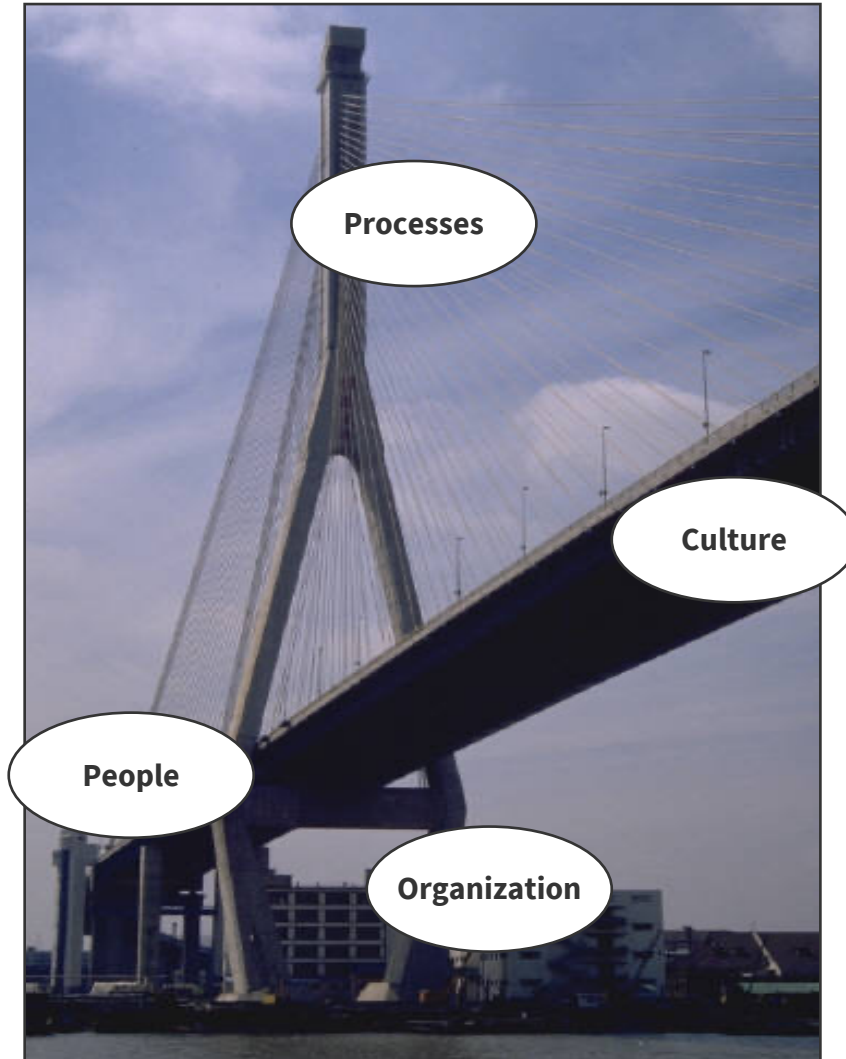
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An organization has decision quality when all participants:

1. Consistently make high quality decisions; it is second nature
 - Recognize and declare the right decisions
 - Frame these decisions appropriately
 - Make their decisions with clear “line of sight” to value.
2. Understand their decision roles and have the right skills
3. Use efficient decision processes routinely and appropriately
 - Address each decision situation with the right balance of content, analytic rigor, and facilitation to reach a timely quality decision.
4. Are aligned around decision quality and have a healthy decision culture
 - Have a common language for and understanding of decision quality—including an understanding of value and value metrics
 - Have a shared desire for decision quality, and “walk the talk”
 - Have eliminated dysfunctional decision habits
5. Continuously learn and improve decision quality.

Healthy decision cultures achieve organizational congruence by adopting DQ throughout the project organization.

- Common language and philosophy of decision-making
- Transparency and clear line-of-sight to value
- Shared understanding of value and value metrics
- Shared objective of decision quality
- Dedication to a healthy decision culture that does not tolerate dysfunctional decision behaviors
- **Organizational Congruence:**
 - Alignment of people, processes, culture, and organization
 - Working in harmony that is self-reinforcing
 - Knowing that failure arises from just one broken part!



What does a healthy decision culture look like to you?



ODQ is built on Five Pillars of Strength.



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CHEVRON OVERCOMES THE BIGGEST BIAS OF ALL

By Carl S. Spetzler, Strategic Decisions Group

An SDG White Paper

ABSTRACT

Many in the behavioral decision science community describe how our human nature falls short of making the best decisions. But none of the potential solutions address what we've come to identify as the Biggest Bias of All – the perception that we are good at making decisions. In truth, human nature favors decisions that satisfice, not those that optimize. By adopting a systematic framework for finding the greatest value, we can often double the value from any decision. Chevron Corp. has blazed the trail, by adopting and implementing Decision Quality over the past decade and outperforming its peers in the industry.

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DIFFERENCE CAN BE ATTRIBUTED TO MAKING BETTER DECISIONS.



Why Is Taking So Long to Get ODQ Adoption?

If ODQ is so valuable, why hasn't adoption occurred more rapidly? I gave an answer to this question five years ago:¹²

- First, we did not see the entire picture [of ODQ] until some 15 years ago.
- Second, the professional community that does comprehend the whole picture is relatively small and includes very few academics that have published on the topic.
- Third, developing ODQ requires doing a lot of things right and then having them all work well together. It is a major transformational challenge, and there are many ways to fail.
- Fourth, the notion remains popular that decision-making is a matter of having the feel and making the call, that some people have an innate ability to do this well and all we need do is find them.
- Finally, many proponents [of ODQ] place too much importance on the role of decisions and thereby denigrate the importance of execution, alienating many line executives. A good decision is only the first step in value creation: It creates value potential that cannot become real value until executed effectively. Competent decision-making must assume its appropriate place in the overall value creation chain.

Today, I would add that the biggest barrier to rapid adoption is the Biggest Bias of All. We humans are wired to make good'nuff decisions and to rationalize them afterwards.¹³

“Early in our career Amos Tversky and I believed for a time that rationality might prevail: we expected to witness in our lifetime a significant improvement in the quality of crucial decisions, both in government and in business, thanks to the then-new field of decision analysis. We thought that organizations would hire professionals to help them reach important decisions by a rational process.”

“We did not sufficiently appreciate the burden and the risks that a commitment to a rational model imposes on decision makers facing critical choices, and the extent of resistance of rational analysis in the public to which leaders answer.”

Source: D. Kahneman – unpublished draft of chapter on Decision Analysis for *Thinking Fast and Slow*

Since Chevron has DA in its DNA, it's obvious to ask: What is the shareholder return?



We asked:



Larry Neal



Frank Koch

The individuals who, with colleague Brian Putt, are most responsible for the adoption of DA at Chevron.

In Larry Neal's words ...

As far as your question on the dollars, I just wouldn't know where to start. It would certainly be in excess of \$100 billion over the 20 years, but I don't think the money is the key point.

Carl asked us in the webinar what management would miss most if DA was taken away. I answered that framing would be missed the most, and Brian Putt nodded in agreement. DA has brought framing to our daily thinking process here in CVX. In my opinion, the awareness of framing has short circuited more poor decision-making in all areas of our organization over the 20 years than anything else.

The large formal DA studies get the spotlight, but it's the day-to-day influence on employees' thinking that generates the real value.

I remember a corporate-wide memo (what we used to call a "blue top") on our new DA process back in 1992, and our steering team stated a goal that we wanted people to "think in that way." I think we've done pretty good at that.



In Frank Koch's words ...

Quantifying DA benefits has always been a challenge to me, in part because you need to make assumptions of what you would have done without DA and in part because it is hard to separate the value from DA from other parts of the process.

There are anecdotal examples of benefits, especially when a momentum strategy is stopped, avoiding a very bad decision. The best examples may be a number of megaprojects that were on the fast track in Texaco that Chevron re-examined with DA/CPDEP and found substantial improvements.

I agree that there is huge benefit in framing and “getting the problem right” to start with. The other benefit to the process is the added confidence it gives decision-makers which has enabled us to pursue projects and accept risks.

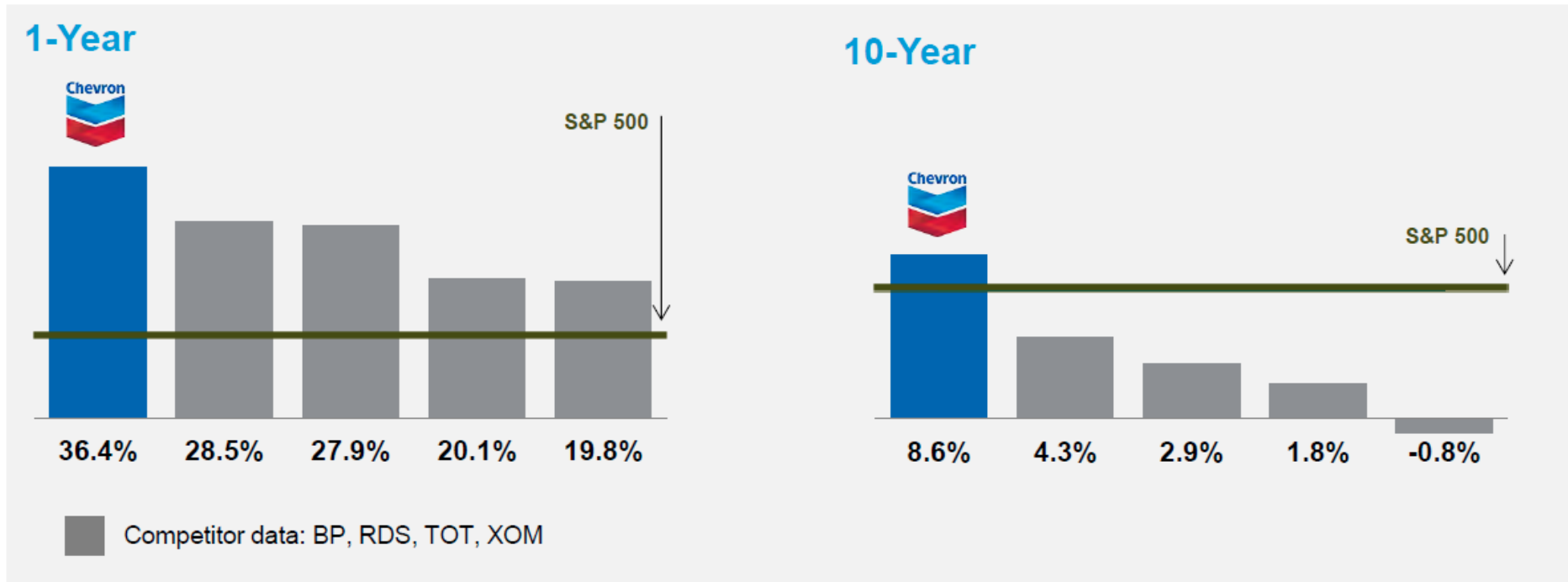
In terms of benefit to cost ratios, they are immense simply because the added cost of doing DA is negligible. We would still be paying the analysts and decision makers without DA, They would simply be talking about different things. The incremental cost of having a better, more relevant conversation is zero, so regardless of the benefit, the ratio is infinite! Even if I throw in the cost of training and learning some software, that's measured in thousands and the benefits are clearly measured in millions.



Total shareholder return

CVX leads peer group in TSR for 1, 3, 5, 7, 10 and 20 year periods

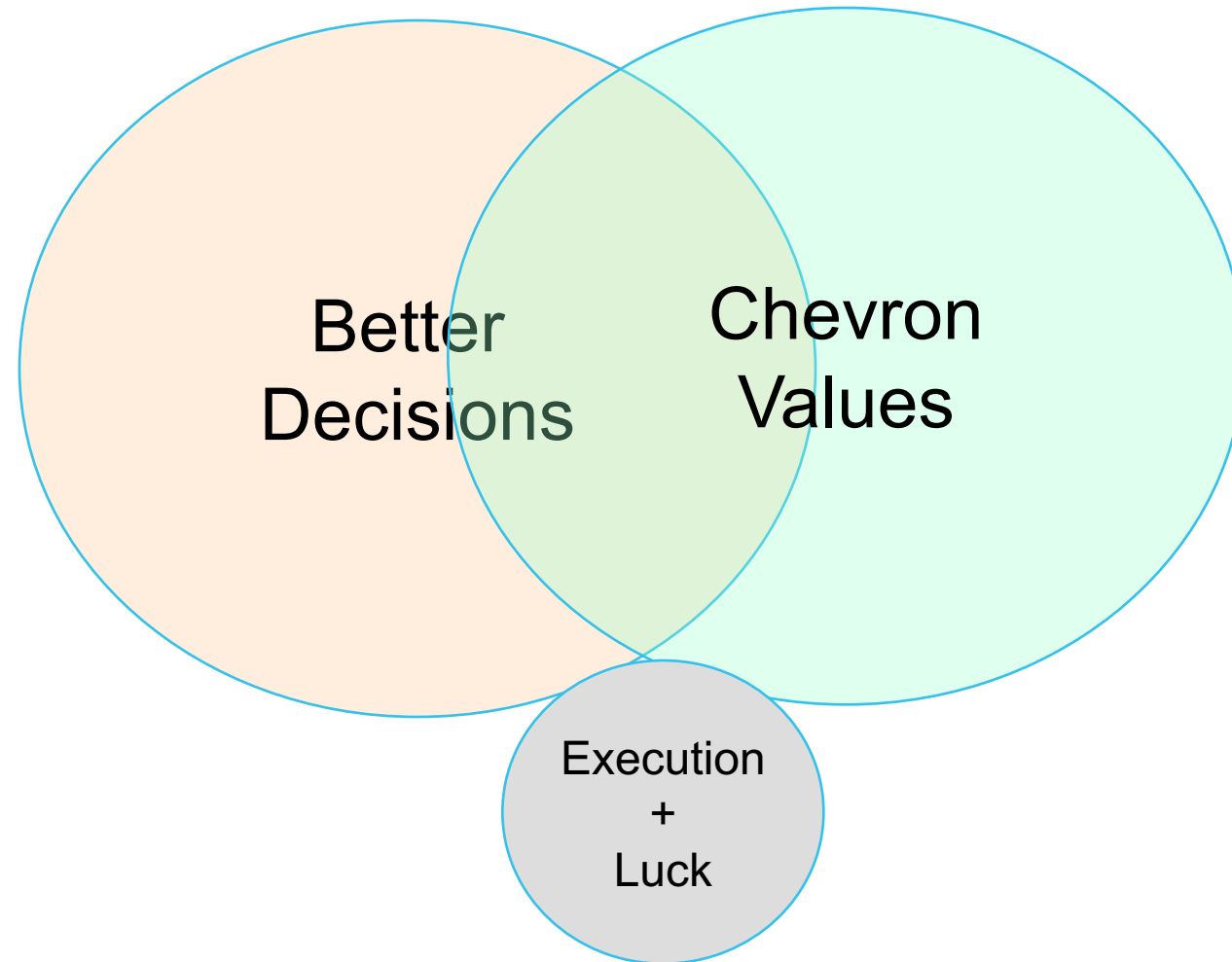
Total Stockholder Return as of 12/31/16



Note: For TSR comparison purposes, ADR / ADS prices and dividends are used for non U.S. based companies. Dividends include both cash and scrip share distributions.

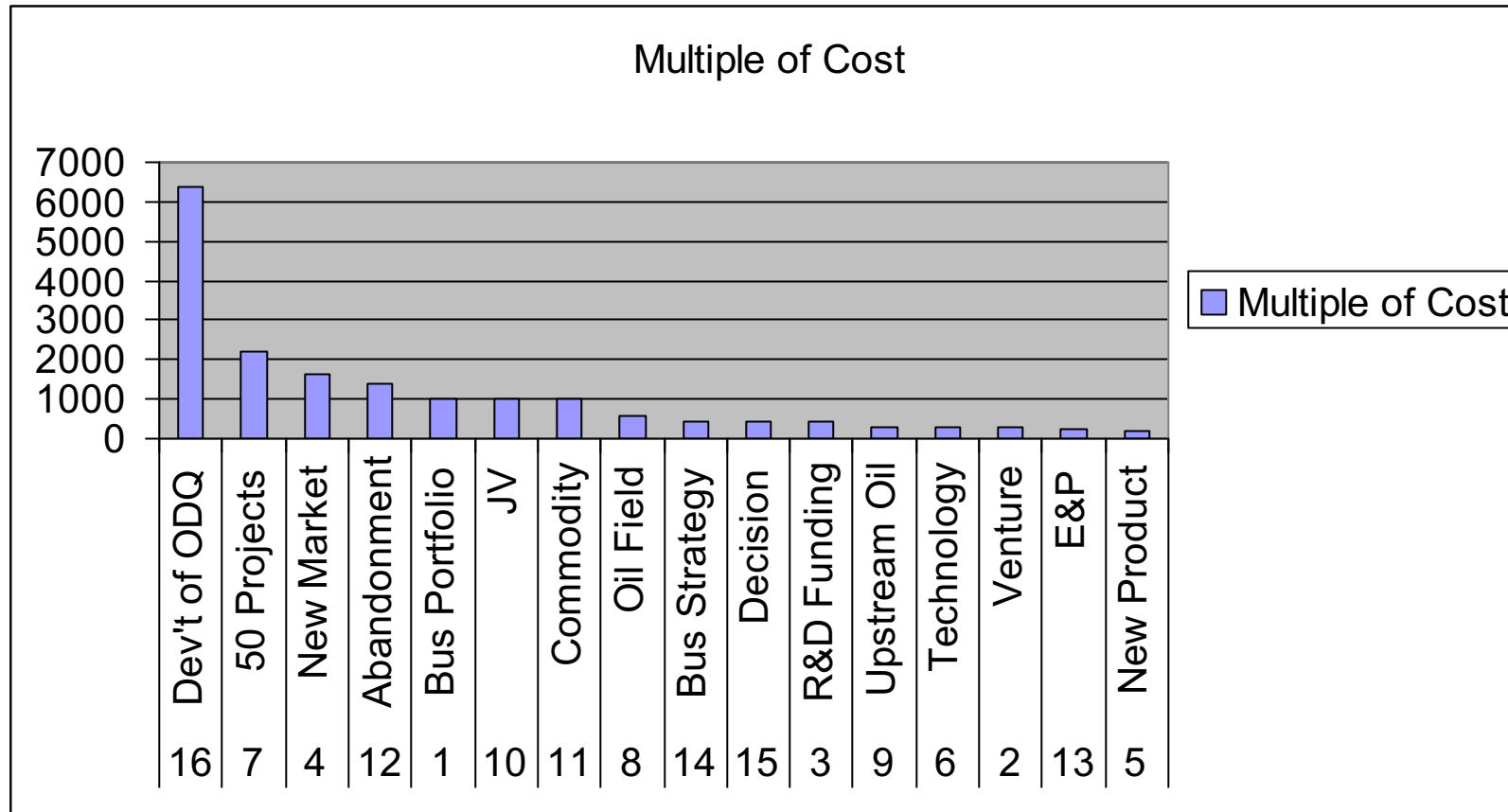


About 100 Chevron decision professionals judged the performance difference to be due to:



Return is hard to measure, but at 1200 to 1, accuracy is not the issue.

Increase in value potential (selected alternative versus momentum alternative) divided by the direct cost of the DQ application.



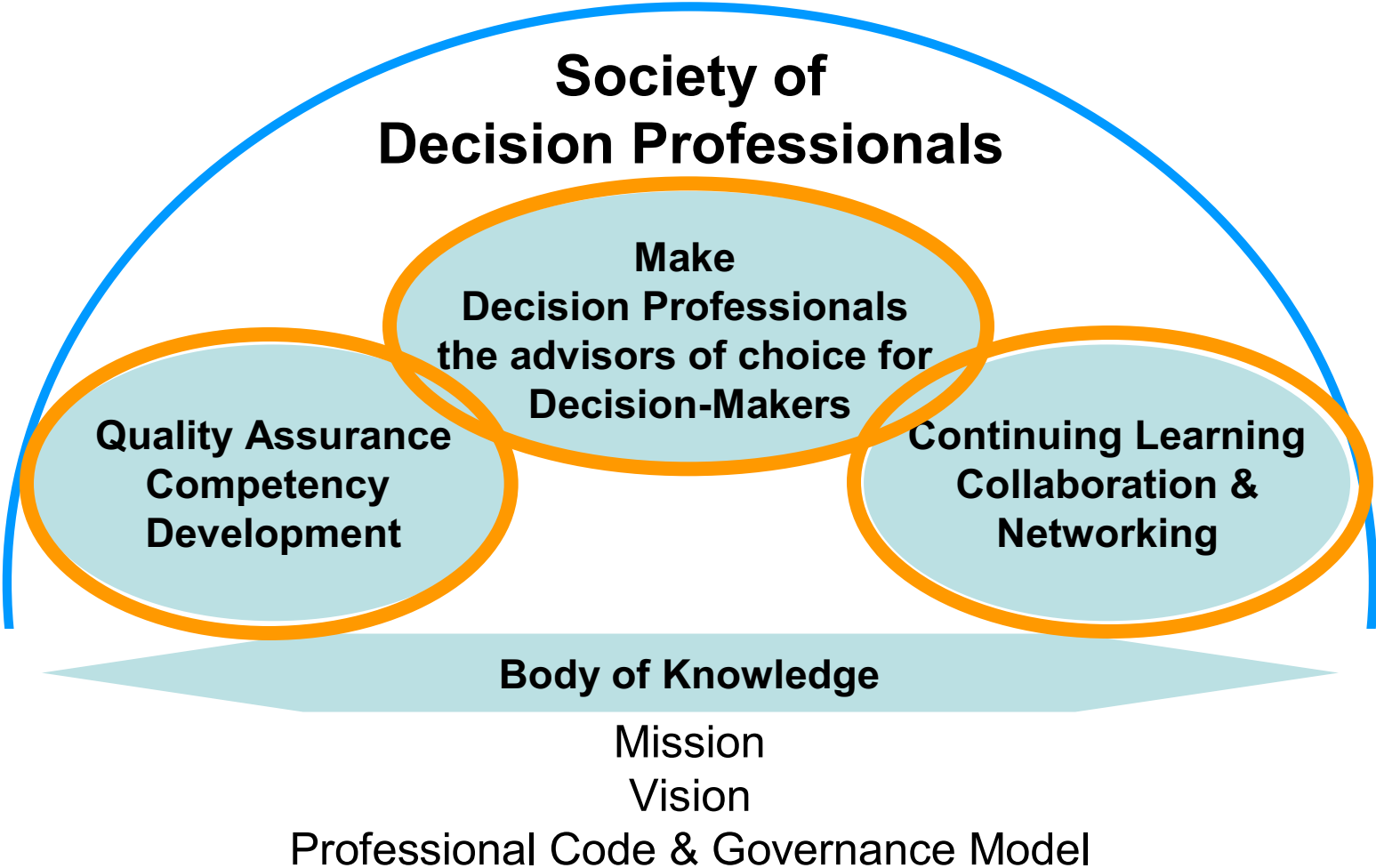
Caveat:

Full value creation requires execution to realize the value potential.

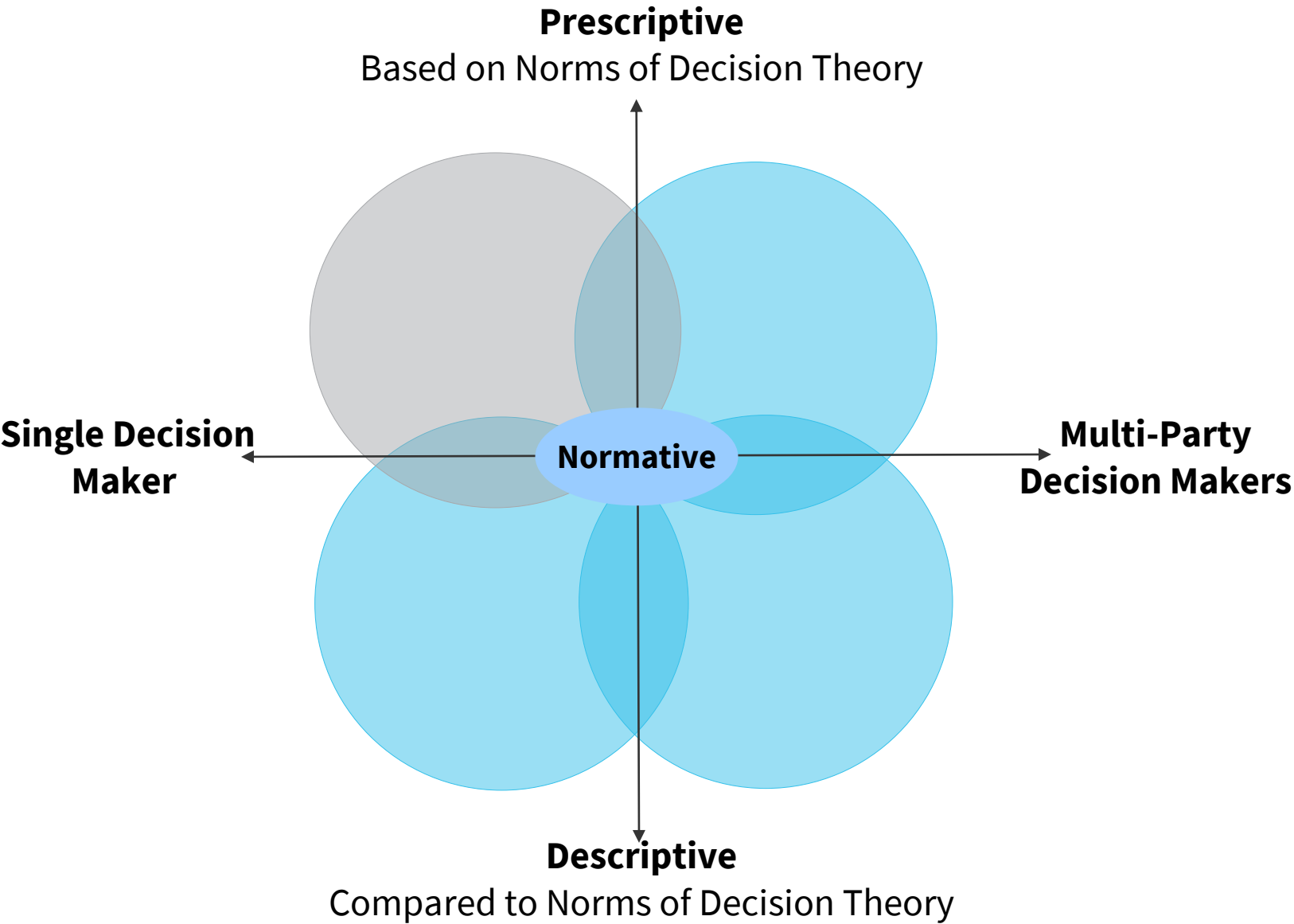
Agenda

- > What is the field today
- > DA in the early days – SRI International to SDG – expanding applications of DA
- > DQ – from 1985
- > ODQ – from 1990
- > ODQ at Chevron and the ROI of DQ (excerpt from a presentation to Chevron in 2011)
- > **Continuing thought leadership**

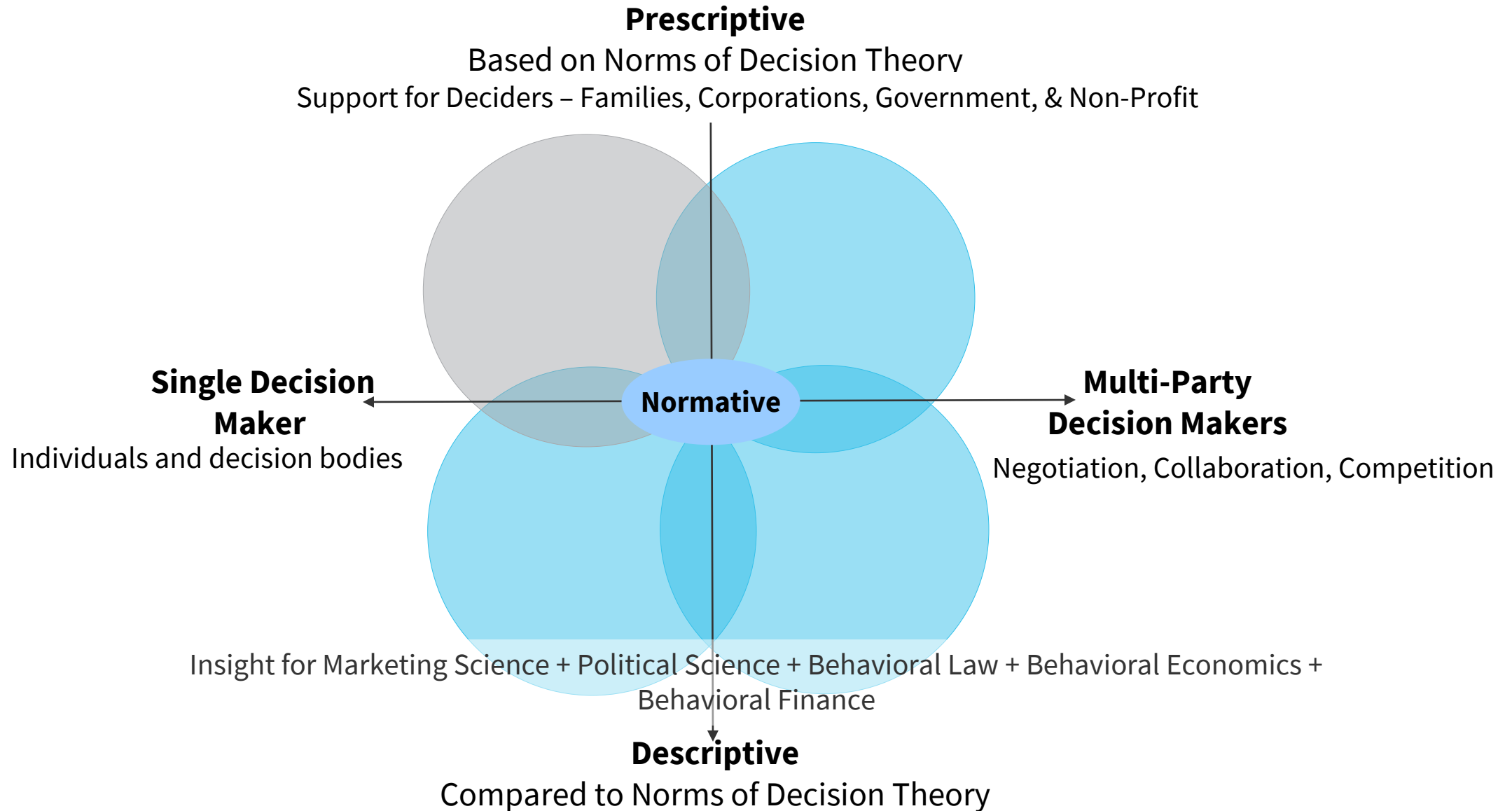
To realize the promise of DQ we need a real profession ...



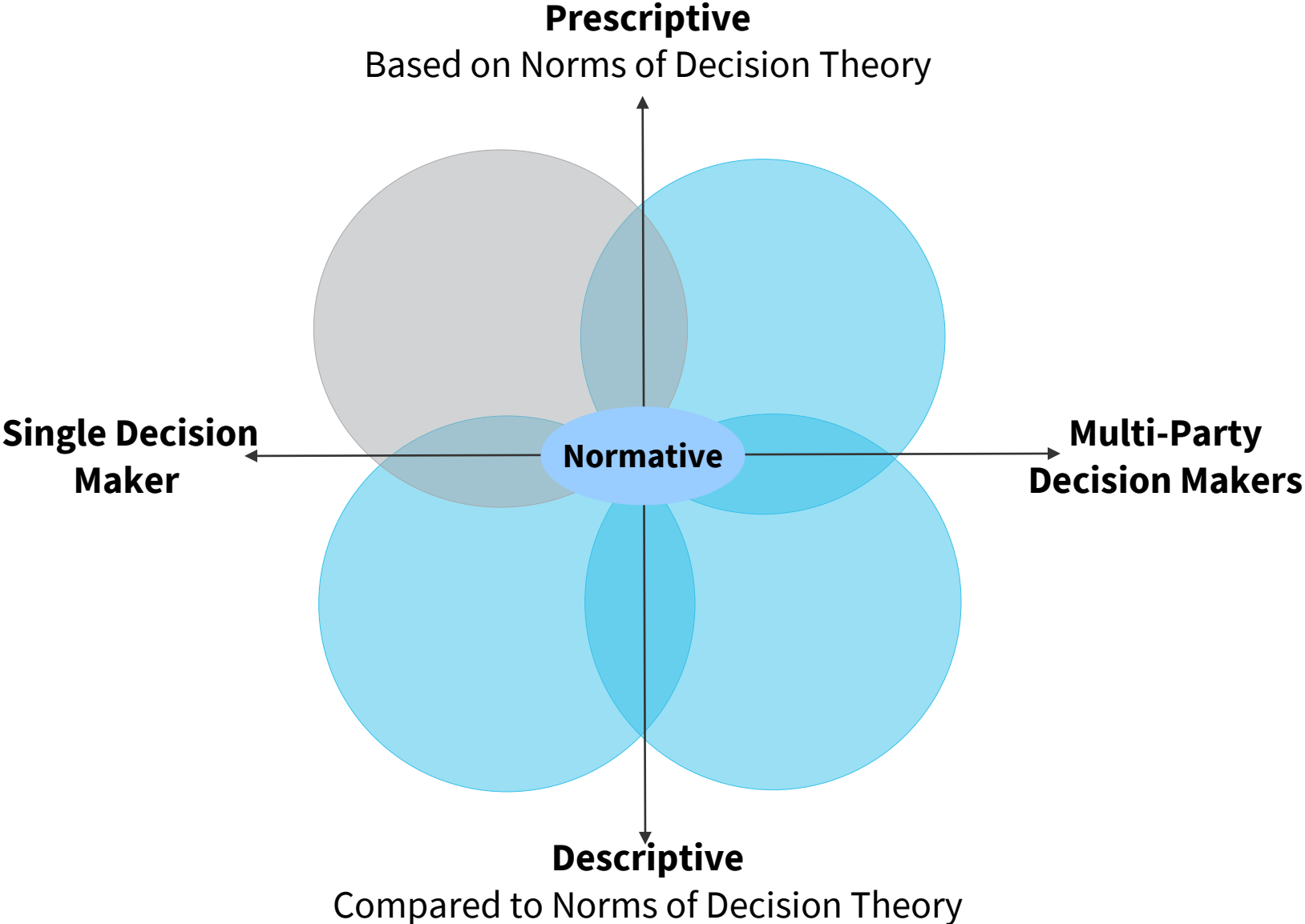
Decision science consists of four major fields of study ...



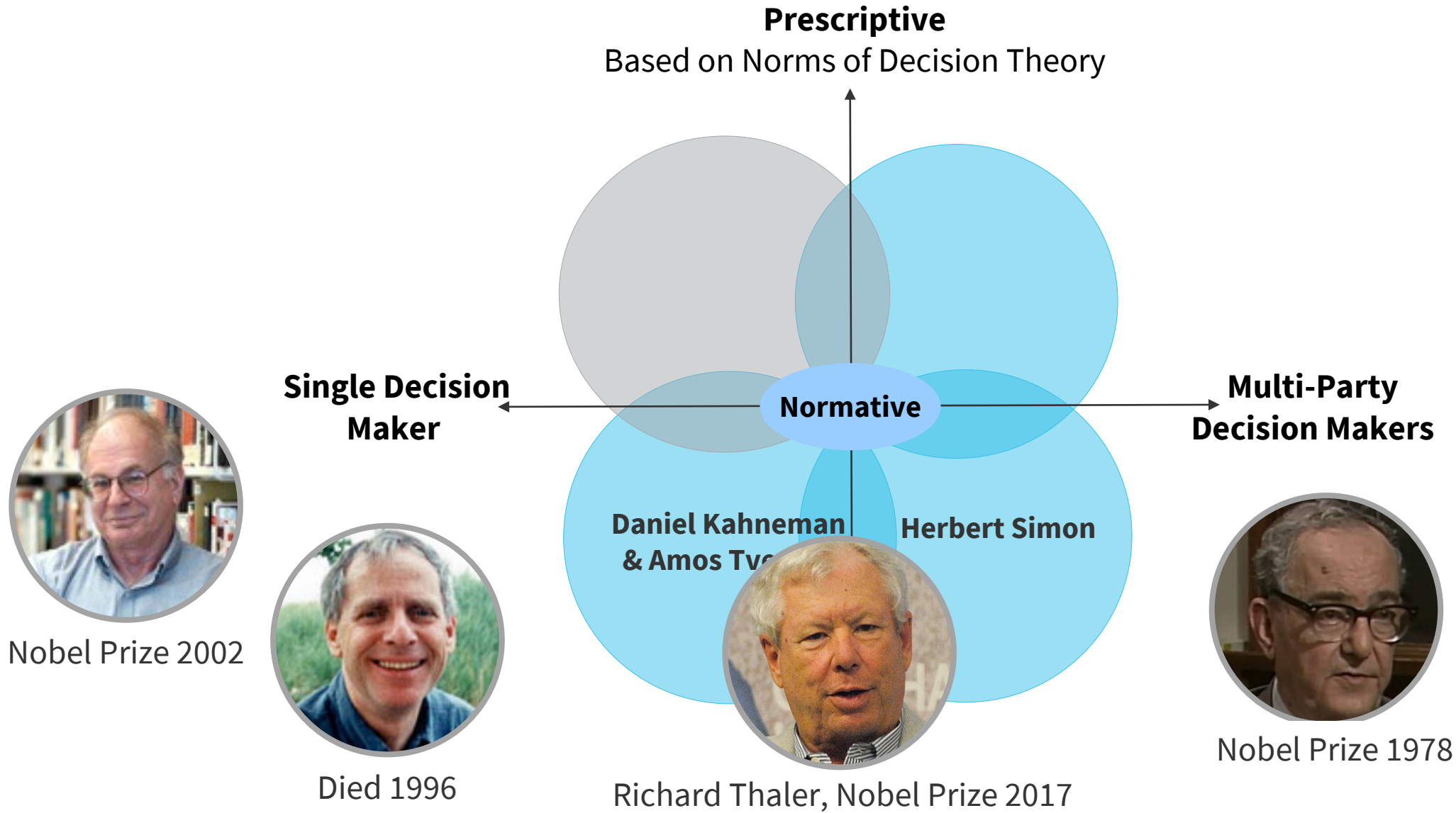
Decision science consists of four major fields of study ...



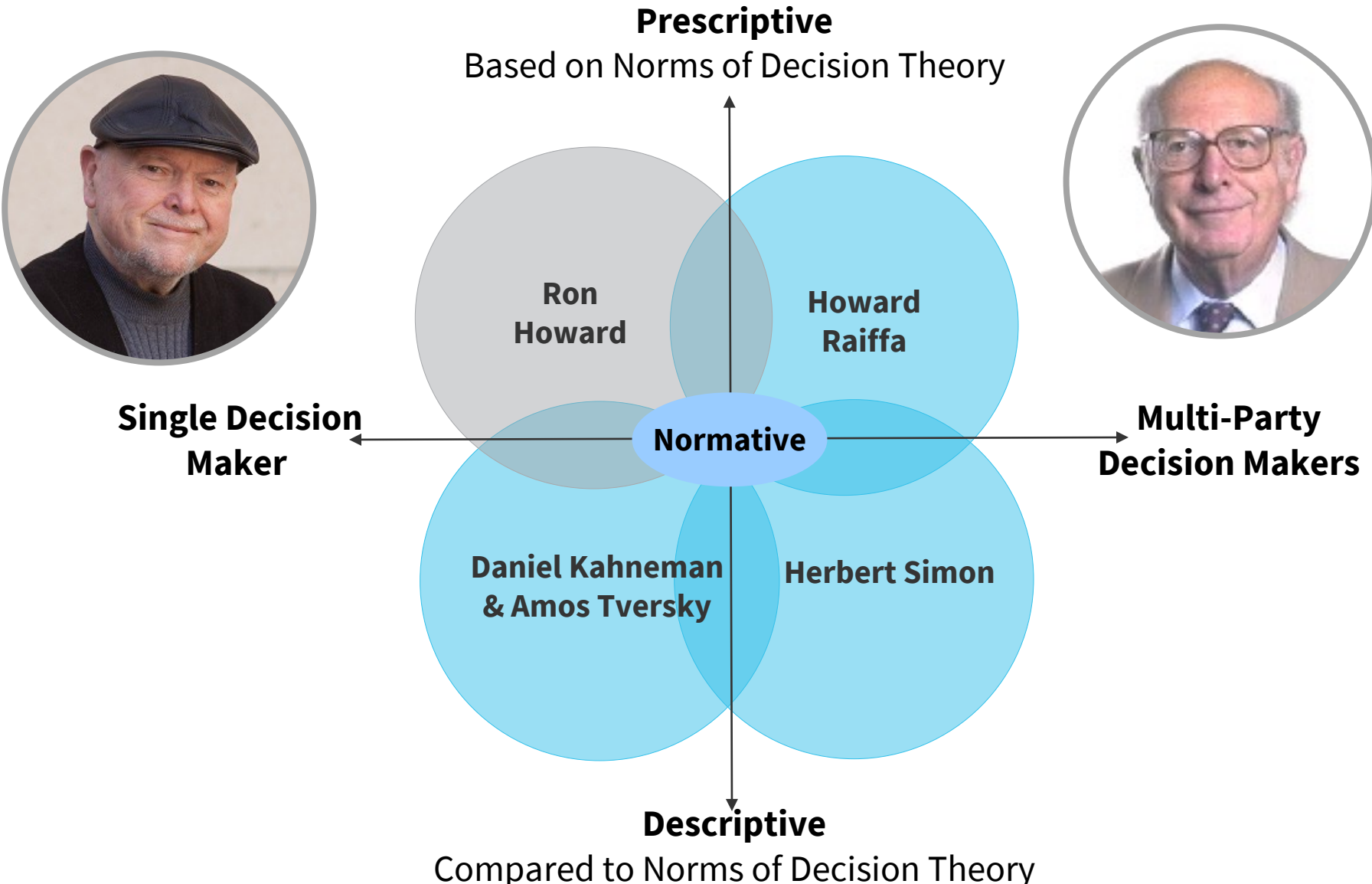
The seminal figures have focused on the different quadrants of the field.



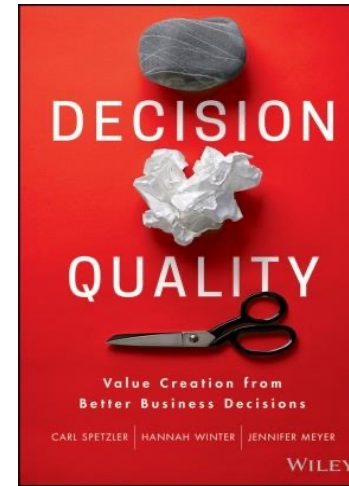
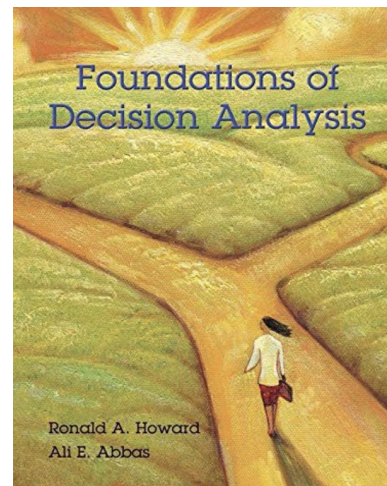
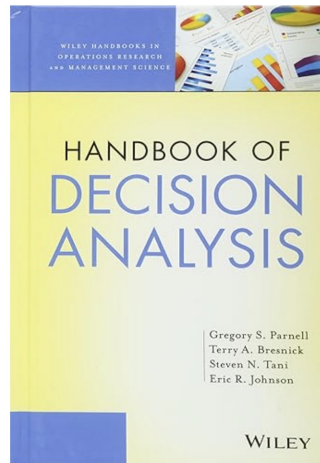
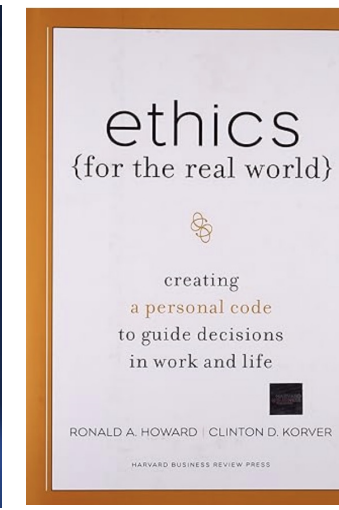
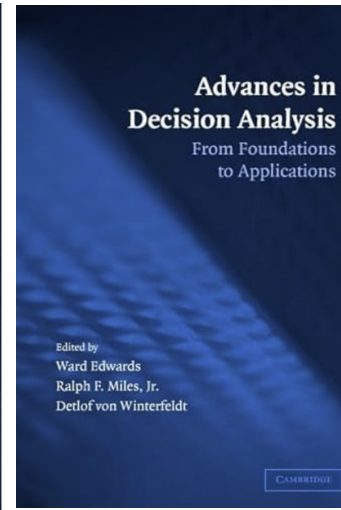
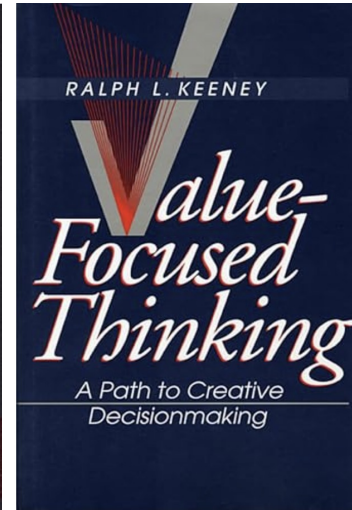
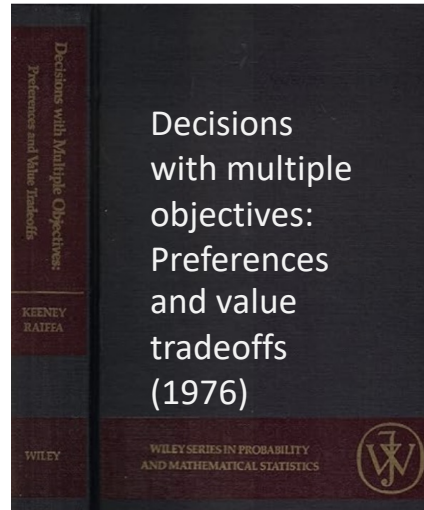
Behavioral decision science has exploded in the last 50 years.



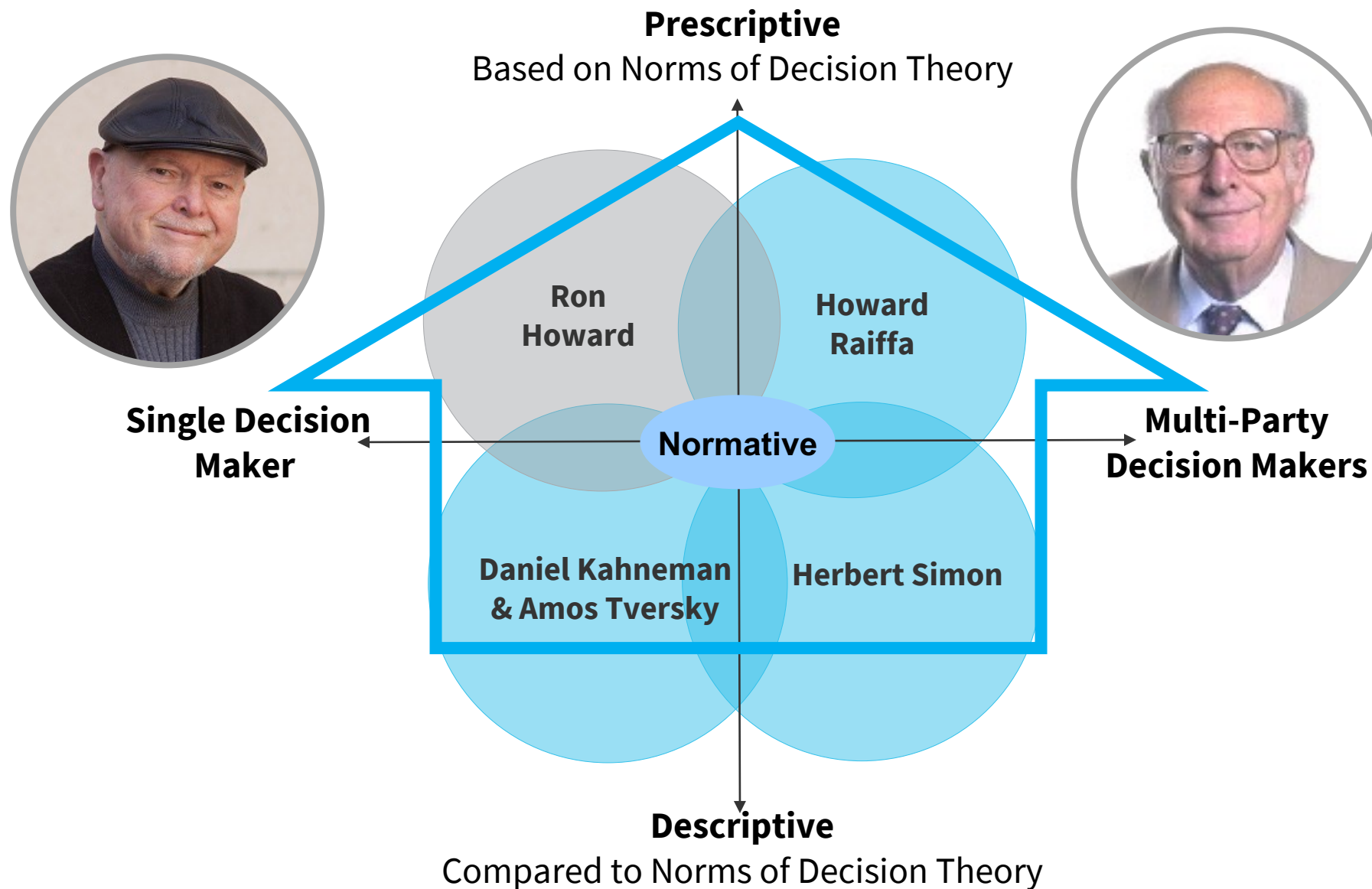
The two seminal figures in prescriptive decision science are Ron Howard of Stanford and Howard Raiffa of Harvard.



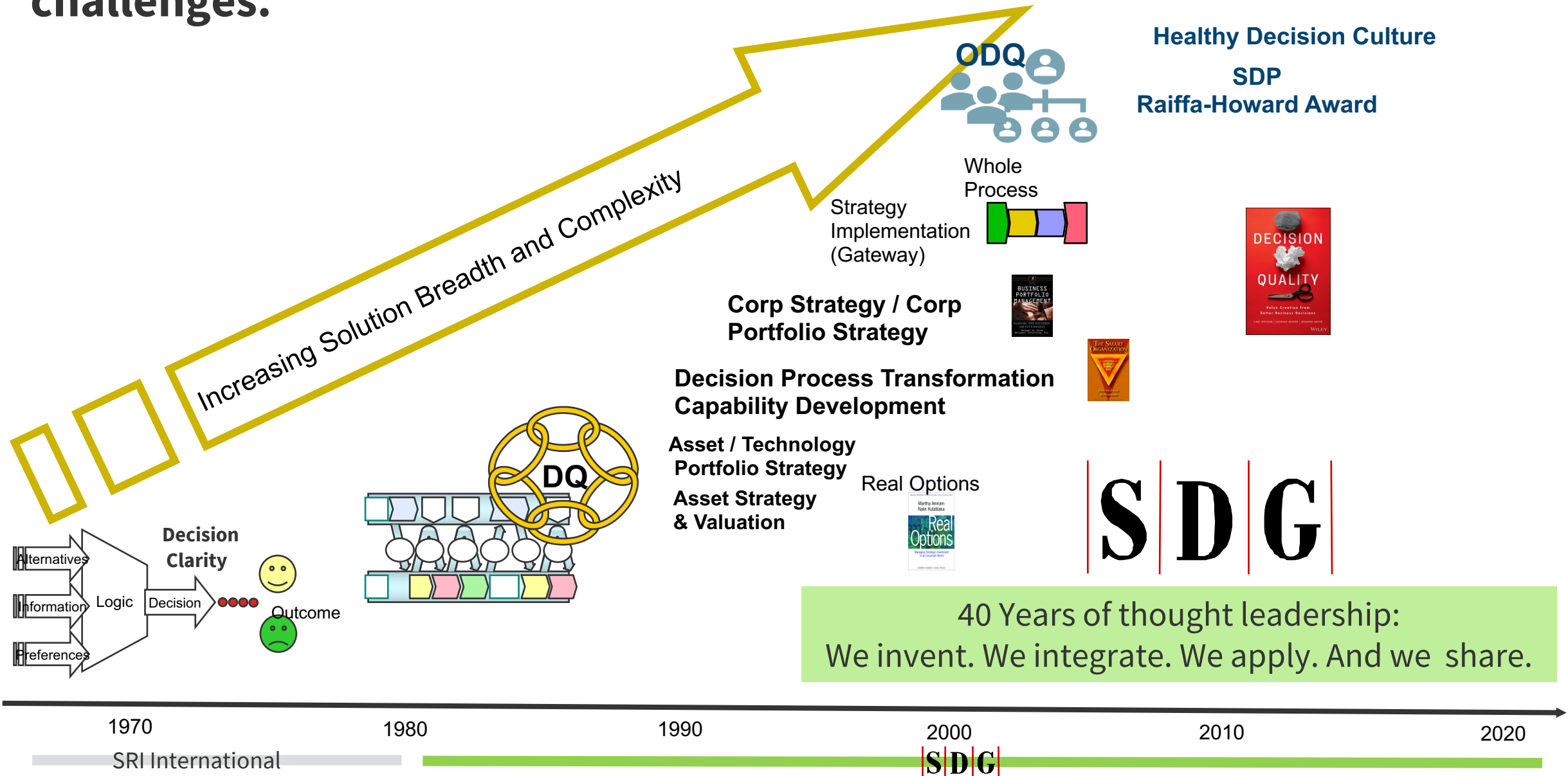
...there have been and continue to be many contributors to the field.



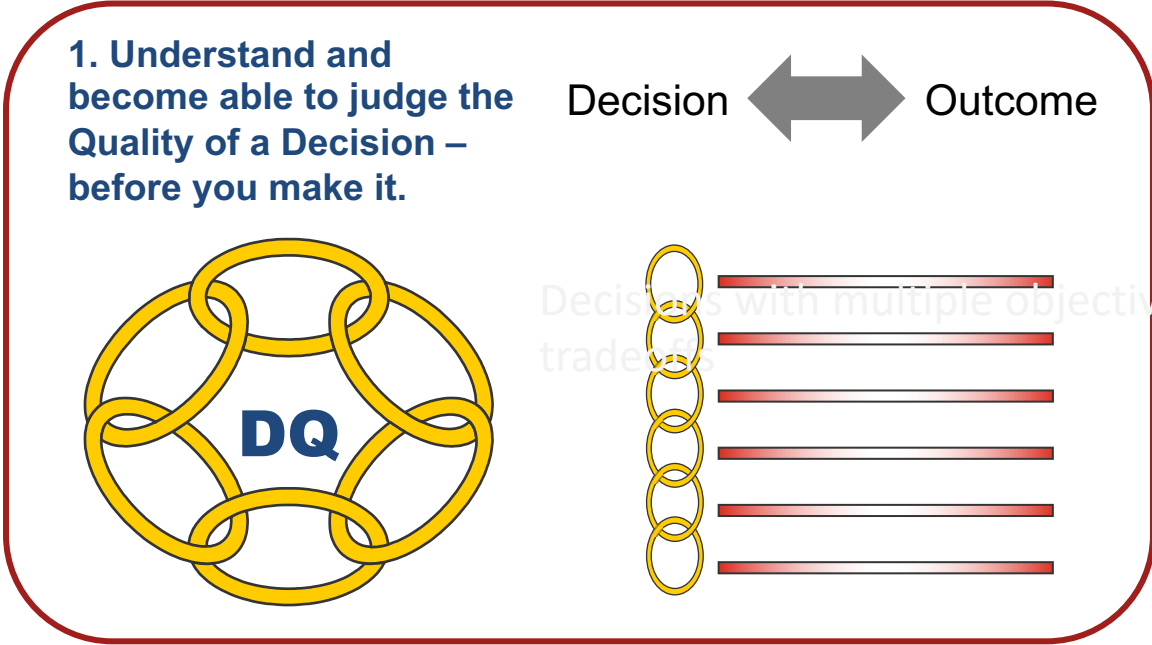
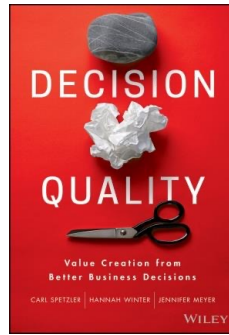
SDG can take pride in being a leading innovator and thought leader for creating real value with DA, DQ and ODQ.



We have brought solutions to ever broader and more complex challenges.



“To the many DQ champions who share our passion for making the common sense of decision quality truly common.”



2. Learn how to diagnose a decision situation and how to select a decision process that drives to Decision Quality.

What is the nature of this decision?

3. Avoid biases, decision traps and mega-biases

4. Become familiar with the most useful tools and displays for decision making.

5. Organizational DQ (ODQ) – Governance processes, roles and responsibilities, delegation/escalation, training and capability building and developing a healthy decision culture.