

Resource Constrained Action Model (RCAM)

Jacob Moorman
Independent
rcam@zerotrack.net

For Randy

Abstract

Resource Constrained Action Model (RCAM) is a problem-solving technique designed for the unique patterns of resource problems. Using RCAM, an individual or team can attack a resource problem from several directions. RCAM visually organizes a problem and then synthesizes a diverse set of actionable recommendations. This technique resists premature closure bias. This paper describes the unique characteristics of resource problems, the RCAM model, and how RCAM can be used as a standalone analytic technique, in tandem with other structured analytic techniques, or with generative AI.

Available Support

Contact the author for paid consultative support, commercial licensing, or to support our work as a patron. The author can be reached at rcam@zerotrack.net

Disclaimers

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Introduction

Decisions are often made based on resource levels or limitations. SCUBA divers are dependent on the air they are carrying. Subscription businesses are dependent on their subscribers. Factories are dependent on raw materials. Order delivery is dependent on product availability. Project execution is dependent on staffing and time. These are examples of tangible resources, but decisions are also made based on intangible resources, such as the quality of the customer experience or managed risk levels.

Resource decisions are made at strategic, operational, and tactical levels. To aid these decisions, many organizations leverage a structured analytic technique (SAT) to provide a means to think through a resource problem systematically. One well-known structured analytic technique is SWOT Analysis (strengths, weaknesses, opportunities, threats). SWOT Analysis is a general-purpose strategic planning tool not optimized for resource problems or operational or tactical decision making.

Strategic planning is in many ways dissimilar from resource problem solving:

- Where strategic planning considers time in months or years, resource problems may have short-, medium-, and long-term considerations in minutes, hours, days, months, or years.
- Where strategic planning often aims to define an overarching all-inclusive goal, resource problems can require attack from multiple directions and may benefit from distinct solutions.
- Where strategic planning aims to produce a durable plan, resource problems change (naturally and due to action), so it must be possible to evaluate changes and determine if plans must change.

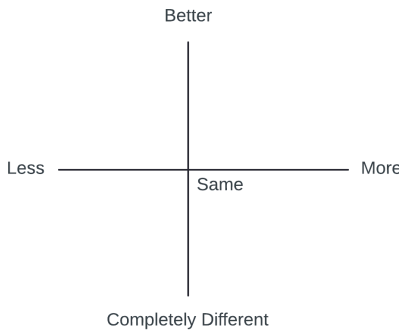
Resource Constrained Action Model (RCAM) is a structured analytic technique designed for strategic, operational, or tactical consideration of resource problems. Individuals and teams can use RCAM. RCAM can be used standalone or in tandem with techniques like SWOT. RCAM can be used on paper or whiteboards, mentally, electronically, and with or without the assistance of generative AI. RCAM can be used on newly discovered greenfield problems or in the middle of an existing problem response. RCAM can be used to produce an initial plan and then to consistently refresh that plan if conditions change.

RCAM Process

Step 1. Draw RCAM

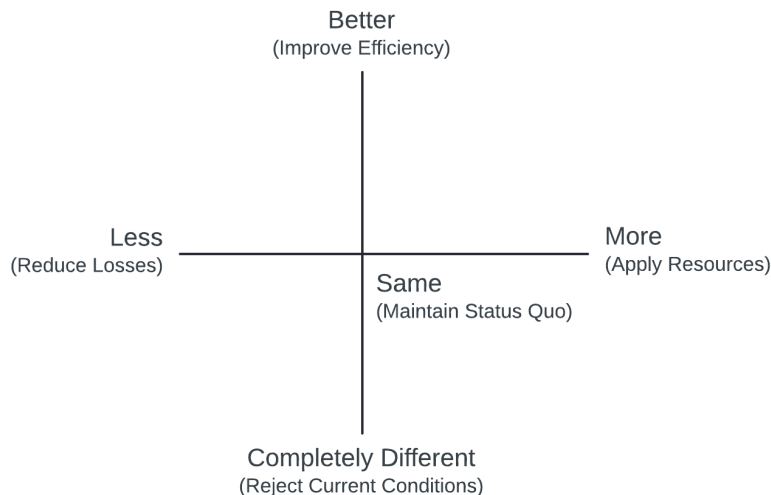
Implementing the Resource Constrained Action Model (RCAM) requires no formal training or tooling. The technique can be understood in minutes. In this step, we will prepare the model and identify the Subject. RCAM can be drawn on a whiteboard, on paper, or electronically.

We begin by drawing a grid (horizontal and vertical axis). We label the right **More**. We label the left **Less**. We label the top **Better**. We label the center (origin) **Same**. We label the bottom **Completely Different**.



We now have positions for **More**, **Better**, **Less**, **Same**, and **Completely Different**, representing the five RCAM categories. We can embellish our model with action labels:

- **More**: apply resources
- **Better**: improve efficiency
- **Less**: reduce losses
- **Same**: maintain the status quo
- **Completely Different**: reject current conditions



A new copy of the model should be drawn for each problem. So we know what problem we are solving, we should note the Subject of this model at the very top. A good subject reflects the constrained resource and the problem we are facing. For example, “Joe’s automobile has insufficient fuel for the 80-mile journey”.

Step 2. Create a Focused View of the Problem

Using the model drawn in Step 1, we will use available information to create a focused view of our problem. We will triage the current state. Each piece of information will be placed in one category of the model. In this step, we want to understand how the resource is constrained and how impact is generated from the resource.

We will begin with the **Same** category in the model’s center. Within this category, we should record the current resource state. What is the current state of the Subject resource? In our example (Joe’s automobile has insufficient fuel for the 80-mile journey), our current state is 3 gallons of fuel.

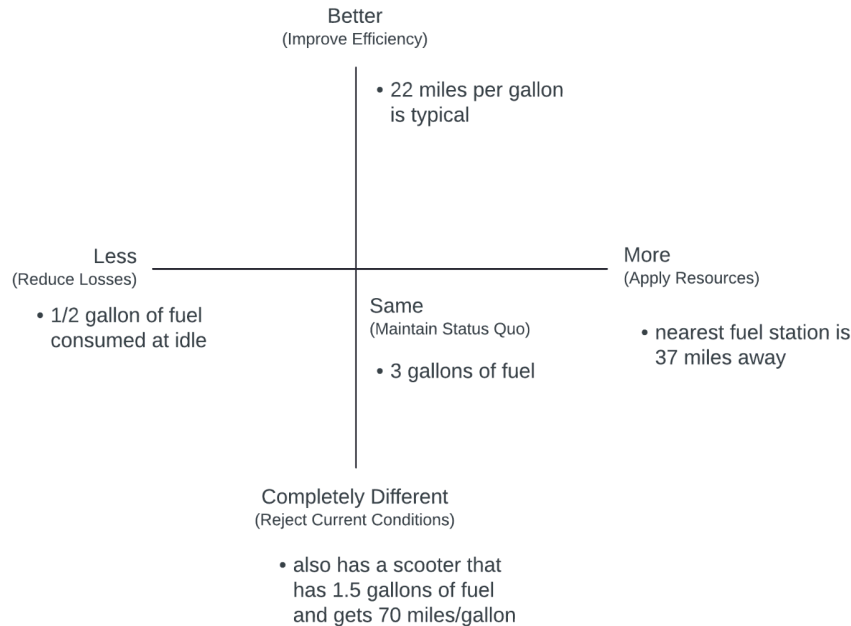
Working across the horizontal axis, we are concerned with constraint management. What (if any) losses are reducing this resource? What (if anything) is available to replenish this resource? We can think about using less fuel or getting more fuel. In the **Less** category, we can note that ½ gallon of fuel is consumed at idle. In the **More** category, we can note that the nearest fuel station is 37 miles away.

Working down the vertical axis, we are concerned with the impact generated by the resource. How does this resource produce value? For example, the miles per gallon of fuel. In the **Better** category, we can note 22 miles per gallon.

The **Completely Different** category is used to inventory the dependencies on the resource and what other resources are available. What are the critical dependencies on this resource? What alternatives are known to be available? This category is our primary space for outside-the-box thinking. For example, what if Joe used another vehicle and no longer depended on his automobile? In the **Completely Different** category, we can note that Joe has a scooter that gets 70 miles per gallon and has 1.5 gallons of fuel.

We have now formed a focused view of our problem space.

Joe's automobile has insufficient fuel for the 80 mile journey



Step 3. Describe Critical State, Trajectory, and Urgency

How a problem manifests itself, how the problem response is triggered, and the timeline for response is unique to the situation. Facing a new problem, we need to figure out whether this is a real problem that warrants action or a false alarm. We also need to determine how much time we can take to mount a response to the problem before we are impacted.

Using the evidence we collected in Step 2, we will evaluate if a critical state has already been reached or will be reached, as well as the impact. In this step, we will consider how soon we expect to reach a resource-critical state if nothing changes. First, we will describe what constitutes a critical state.

Adding to our information in the **Same** category, we should record what we believe is the critical resource state. In what state would we consider this resource critical – that it would no longer be able to support operation at the required level? In our example (Joe's automobile trip), the critical state would be 0 gallons of fuel since the automobile would no longer operate.

Is the critical state always zero? No. For many types of resources, such as staffing, a critical state is greater than 0 because full operation is no longer possible absent minimal staffing. Some problems, such as product inventory, may have multiple critical states, reflecting that there can be too little or too much of a resource on hand. We may also purposefully choose to define a critical state higher than our current state to use the model to consider growth problems requiring increased resource capacity or to provide a greater safety margin.

With the critical state defined, we can now determine our trajectory. Our trajectory will indicate whether we are likely to reach a critical state and when that is likely to happen. If we will never reach a critical state or the impact of reaching a critical state is insignificant, we can present that this is probably not a real problem, and the analysis can stop here. We otherwise continue analysis with a better understanding of the available window for response before a critical state will likely be reached.

If a critical state has already been reached and we have been impacted, we can know this is a real problem. Below the Subject line in the model, we can state, "Critical state has already been reached". We may further articulate the impacts we have observed from being in the critical state.

If we have not yet reached a critical state, we either have caught the problem early, conditions have recovered, or this is not a real problem. We need to determine which case applies.

For problems with a tangible resource, we can consider the run rate of resource consumption by considering over time the current state (**Same**), resources added (**More**), resources lost (**Less**), and efficiency (**Better**). A graph can help us understand changes in run rate and whether we are on the trajectory to reach a critical state.

For problems with an intangible resource, we can consider whether requirements or acceptable risk thresholds are likely to be breached. Governance or regulation may define what is considered reasonable.

To convey urgency, below the Subject line in the model, we can state when we believe a critical state will be reached and the expected severity of impact if a critical state is reached. It is one thing to run out of fuel in an automobile a short distance from a fuel station and quite another to reach fuel exhaustion at altitude in an aircraft.

Step 4. Develop Possible Solutions

Using the evidence we collected in Step 2, we can now develop a list of possible solutions. In this step, we want to consider how to remove constraints and negatives and how to retain desirable or necessary conditions. Form a bulleted list of ideas below or beside the model. Attribute each idea to one of the categories (**More, Better, Less, Same, Completely Different**).

The **More** category is focused on applying resources to extend the runway to criticality by infusion. What available or acquirable capacity could help replenish the resource? Capacity may come from reserves, retasking or reassigning existing resources, acquisition or purchasing, promotion, or marketing. In our example, Joe might purchase fuel at the fuel station. Joe might also siphon fuel from his scooter into his automobile. Both approaches would apply resources, so they belong in **More**.

The **Better** category is focused on increasing efficiency, optimizing, and increasing the value generated per resource unit. How can the resource more optimally produce value? In our example, Joe might alter his driving habits to keep his car in Eco-friendly mode and more efficient than the 22 miles per gallon he usually averages. Business problems involving customers can often reflect efficiency in dollars, as it is more efficient to make \$1000 with a \$200/customer average than a \$20/customer average.

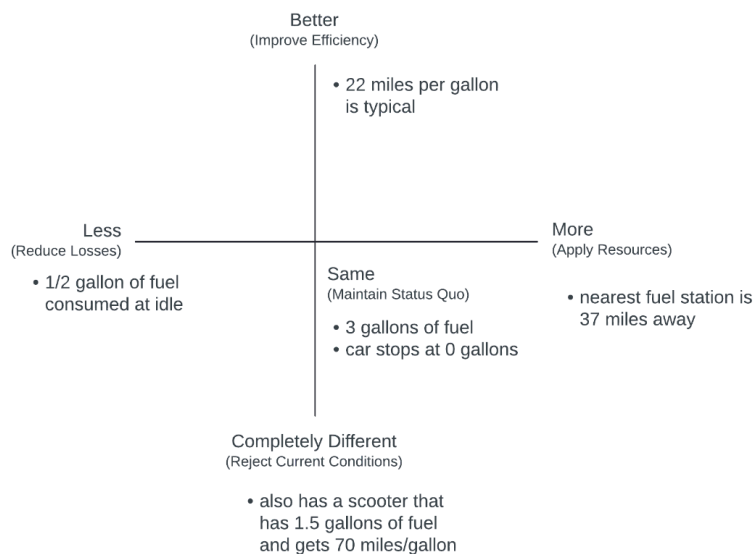
The **Less** category is focused on reducing waste or losses to extend the runway to criticality by bleeding less. How can current losses be counteracted? In our example, Joe might turn off his vehicle whenever he parks to conserve fuel rather than idling. It is often cheaper and more ethical to preserve existing resources rather than acquire more if waste can be reduced without excess impact.

The **Same** category is focused on maintaining desirable or necessary aspects of the status quo. What aspects of the current state do we want or need to keep? Ideas in this category minimize change or variation from the current state, accept the risks of inaction, and delay response while information is gathered or the problem is watched. In our example, Joe might look to get on the road, hoping to find an additional fuel station. Knowing he is low on fuel, he might also be more observant of the fuel gauge. It can be helpful to improve our understanding of the problem and detect changes.

The **Completely Different** category is focused on rejecting current conditions by eliminating the dependency on the constrained resource or rejecting a current requirement that stems from that resource. Ideas in this category take the “nuclear option” and may discard or cannibalize the existing audience, product, or mission to implement something completely different. How might we eliminate dependencies on this resource? In our example, Joe can now consider options that eliminate his automobile from the equation or change the trip experience. Joe could take public transportation. Joe could take his scooter. Joe could cancel the trip.

Our model is now fully populated. By considering each category, we have reduced the likelihood of premature closure. If we have one category with a long list of ideas and another with none, we can recognize the need to consider the situation further. The alignment of evidence to ideas or evidence gaps can also help us to identify where we may have remaining blind spots that require consideration.

Joe's automobile has insufficient fuel for the 80 mile journey
If nothing changes, we will be out of gas with 14 miles to go.



Ideas

- More: Purchase fuel in 37 miles
- More: Siphon fuel from scooter
- Better: Drive more efficiently
- Less: Turn off parked car rather than idling
- Same: Look for another fuel station
- Completely Different: Take public transit
- Completely Different: Take the scooter
- Completely Different: Cancel the trip

Step 5. Prepare a Recommendation

With our list of ideas from Step 4, we can now consider the viability of ideas, package them as a solution, and form a recommendation. In this step, we will consider individual ideas and groups of ideas.

What constitutes a viable idea will depend significantly on the environment. Governance, or regulations, or the team's charter may define specific criteria to determine whether a solution is viable. If we are unsure about how the people or politics of the situation might complicate solution viability, we might need to enlist a domain expert to guide us. Some things that may be appropriate to consider in evaluating risk vs. reward are:

- Costs in time, resources, money, opportunity cost, and risk
- Possible disruption of norms positively (including achieving a partial effect with a partial implementation) or negatively (including through collateral damage) if an idea is implemented
- Feasibility to achieve results before a critical resource state is reached (Is there enough time?)
- The additional risk from unknowns, particularly for **Completely Different** ideas
- Additional factors as per analytic requirements

In determining whether an idea is viable, we should recognize that viability can change over time and may depend on implementing complementary solutions. We should document our understanding of idea non-viability in case that idea viability changes later or needs to be explained.

Our recommendation should be formed from one or more viable ideas. For some problems, one recommendation is sufficient. In other cases, we may need to present several cost options or short-, medium-, and long-term recommendations.

If appropriate, a copy of the RCAM model can be prepared to present a proposed solution package concurrently with supporting evidence. It can be helpful to reference **More, Better, Less, Same,** and **Completely Different** to demonstrate how the problem would be attacked from several directions.

RCAM Examples

The following samples include a fictional case, some with sample data, and draft ideas.

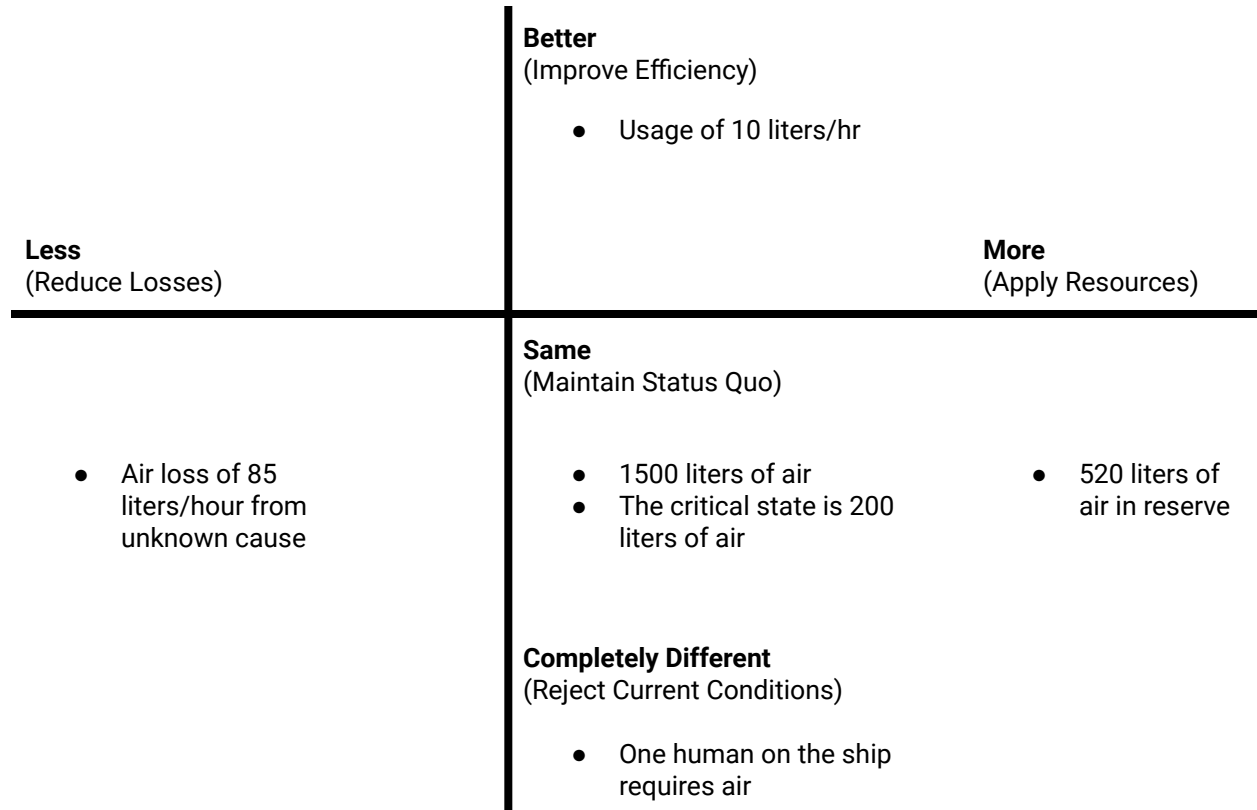
To practice RCAM, consider:

- What other data would be helpful in the decision-making process?
- What other solutions exist?
- Which ideas warrant recommendation?

RCAM Example 1: An Astronaut facing an air leak

Subject: An air leak is reducing the remaining air time on the *fictional* LADON-5 rocket ship.

Trajectory: 15 hours 17 minutes to air criticality, when all on board the ship will die.



Ideas

- Same: Take no action; wait this out.
- Less: Close compartments to reduce losses.
- Less: Find the leaks and patch them.
- More: Resupply air from the reserve.
- Better: Reduce consumption by humans and machines.
- Different: Leave the ship.
- Different: Go into stasis (leaving the ship unmanaged).

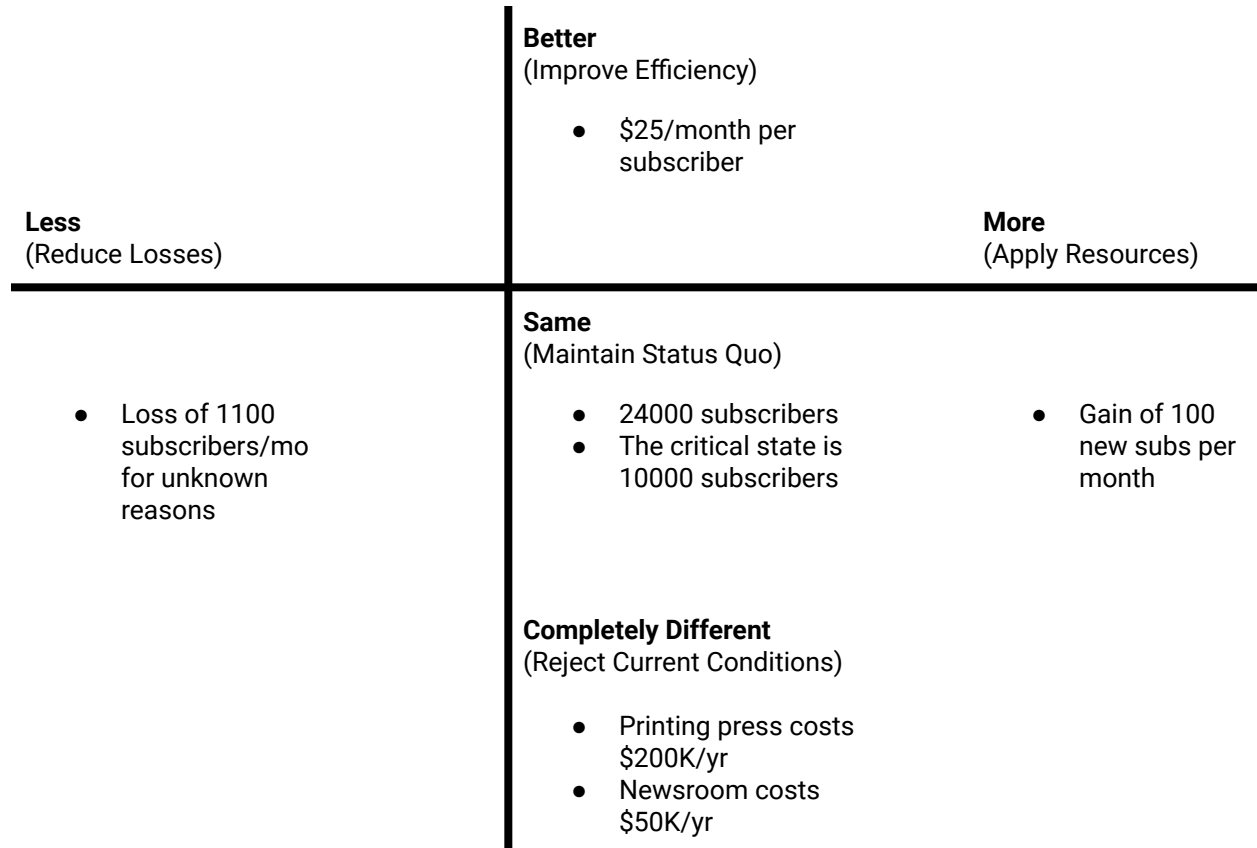
A bit more than 15 hours of air may not be enough, or it could be plenty. If the ship is minutes away from its destination, the astronaut may choose to wait this out. More likely, loss of air time is a critical situation that warrants immediate attention. Depending on the location of the leaks, it might be most viable to close compartments, resupply from reserves, and reduce air consumption until repairs can be made.

The astronaut knows their ship best and can use the model to assess options rapidly.

RCAM Example 2: A Newspaper facing subscriber loss

Subject: Subscriber falloff at the *fictional* Bougainvillea Courier print newspaper.

Trajectory: 14 months to subscriber criticality when the paper would be forced to cease operations.



Ideas

- Same: Take no action; wait this out.
- Less: Run a retention program to reduce subscriber losses.
- More: Run a promotion to increase new subscriptions.
- Better: Increase price per month.
- Better: Offer products and services to extract more value per subscriber.
- Different: Shift to digital format, eliminating print format.
- Different: Shut down the newsroom and run syndicated content.

There has been a global trend in which people get their news online. Since the newspaper does not know why people are leaving, they should likely start with some research to rule out seasonality or other causes. A significant shift to a digital format would unburden the paper from print costs. However, this would also require research on whether the market and existing subscriber support are sufficient to pivot. With some research,, they will be better equipped to consider their options.

RCAM Example 3: Production capacity shortfall

Subject: A *fictional* factory making three products now has excess demand for one product.

Trajectory: Demand already exceeds supply. (Money is being left on the table.)

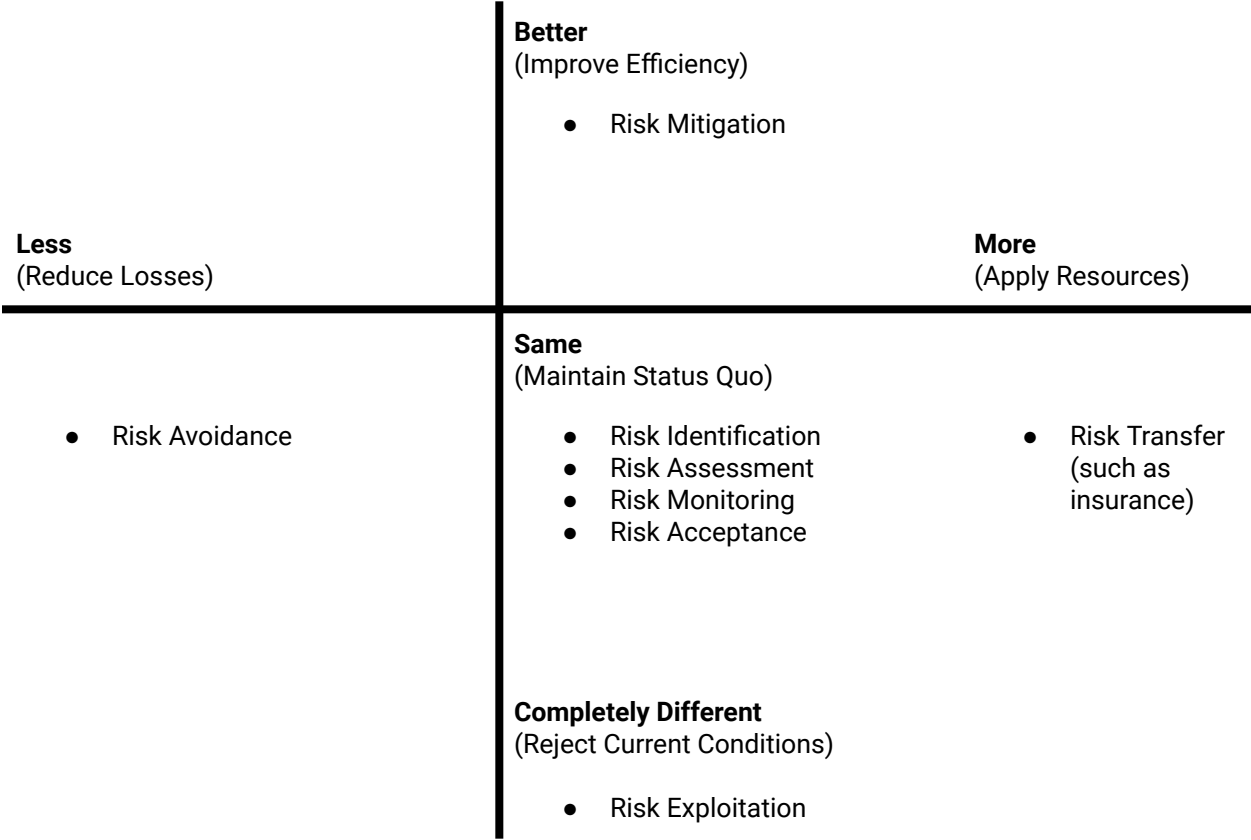
<p>Less (Reduce Losses)</p>	<p>Better (Improve Efficiency)</p> <ul style="list-style-type: none"> • Optimize production methods • Increase prices
<ul style="list-style-type: none"> • Fix quality problems earlier, reducing waste • Apply lean manufacturing practices to reduce waste (DOWNTIME) 	<p>More (Apply Resources)</p> <p>Same (Maintain Status Quo)</p> <ul style="list-style-type: none"> • Serve critical customers first, minimizing shortfall impact • Monitor demand to see if trend continues <p>Completely Different (Reject Current Conditions)</p> <ul style="list-style-type: none"> • Refactor the product, such as finding a more readily producible solution to the underlying problem • Divest or spin off the high-demand product

The factory can envision various options in response to the shortfall in available production capacity. Depending on the shortfall's duration, the possible solution's overhead, and the amount of money involved in unmet demand, this may be a time to wait to see if this is a short-term trend, a time for strategic investment, or a balanced approach with smaller investments. If the production demands are expected to increase more sustainably, it may be time to consider doing something completely different. A decision could be made using data, understanding execution capabilities, and risk appetite.

RCAM Example 4: Risk management next steps

Subject: The *fictional* company is determining the next steps from an initial risk audit.

Trajectory: The risk identified to date exceeds the board-defined acceptable risk threshold.



Typical risk management activities have been included in the model above. These can be replaced with specific details when modeling a problem.

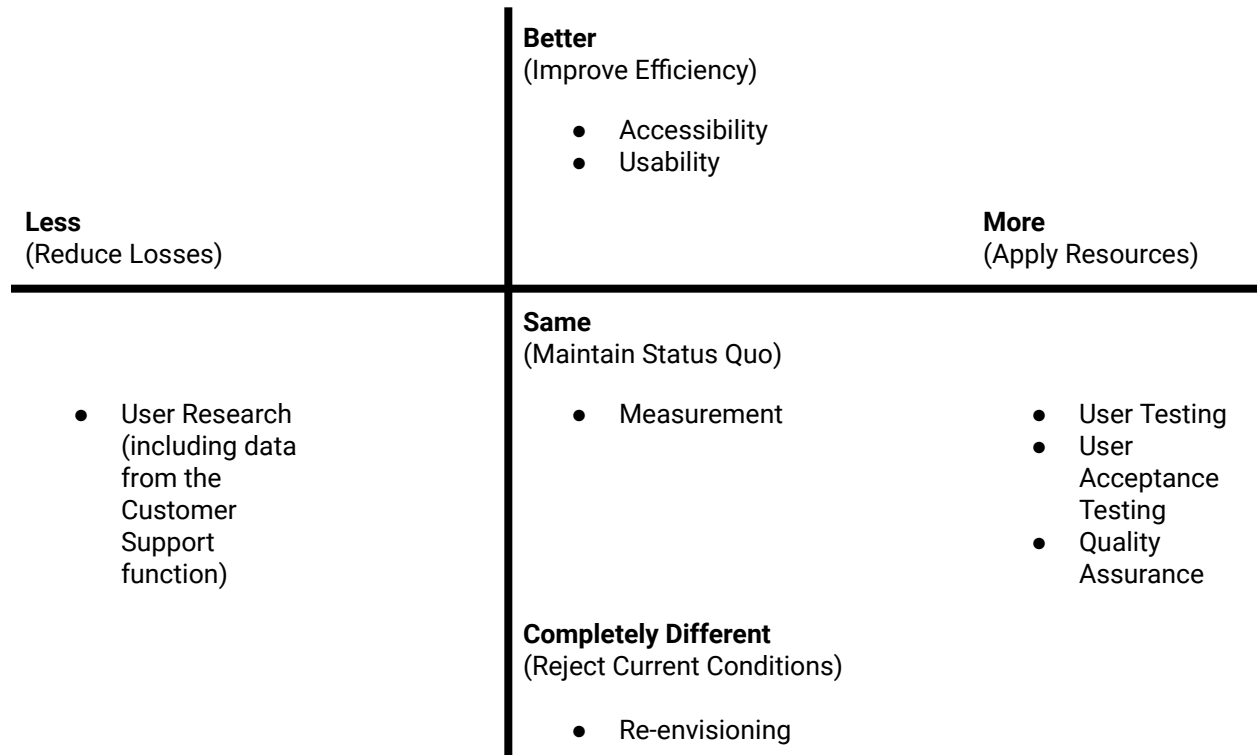
RCAM can be used in several ways. One way is to aid the evaluation of risk responses, either by a single risk response or by considering a risk portfolio. By mapping existing risk management activities or risk responses with RCAM, we can consider whether the balance between RCAM categories is appropriate or if some response options have not adequately been considered. This approach can illuminate capability blind spots, such as the need to identify insurance options to support Risk Transfer.

RCAM can also be used to support problem response. The ability to use RCAM at any point in the response process and revisit prior RCAM analysis can be beneficial when an existing proposed or implemented risk management approach is found to be non-viable or insufficient. RCAM can aid in considering solution viability and help identify whether complementary solutions exist.

RCAM Example 5: User experience deficiency

Subject: The *fictional* company has determined that product users struggle to complete critical tasks.

Trajectory: Key customers have declared intent to leave unless issues are resolved.



A sampling of approaches has been included in the model above. These can be replaced with specific details when modeling a problem.

Designers, engineers, product teams, support technicians, sales, marketing, and the management team can all want a high-quality product or service experience while being saddled with a product that needs improvement.

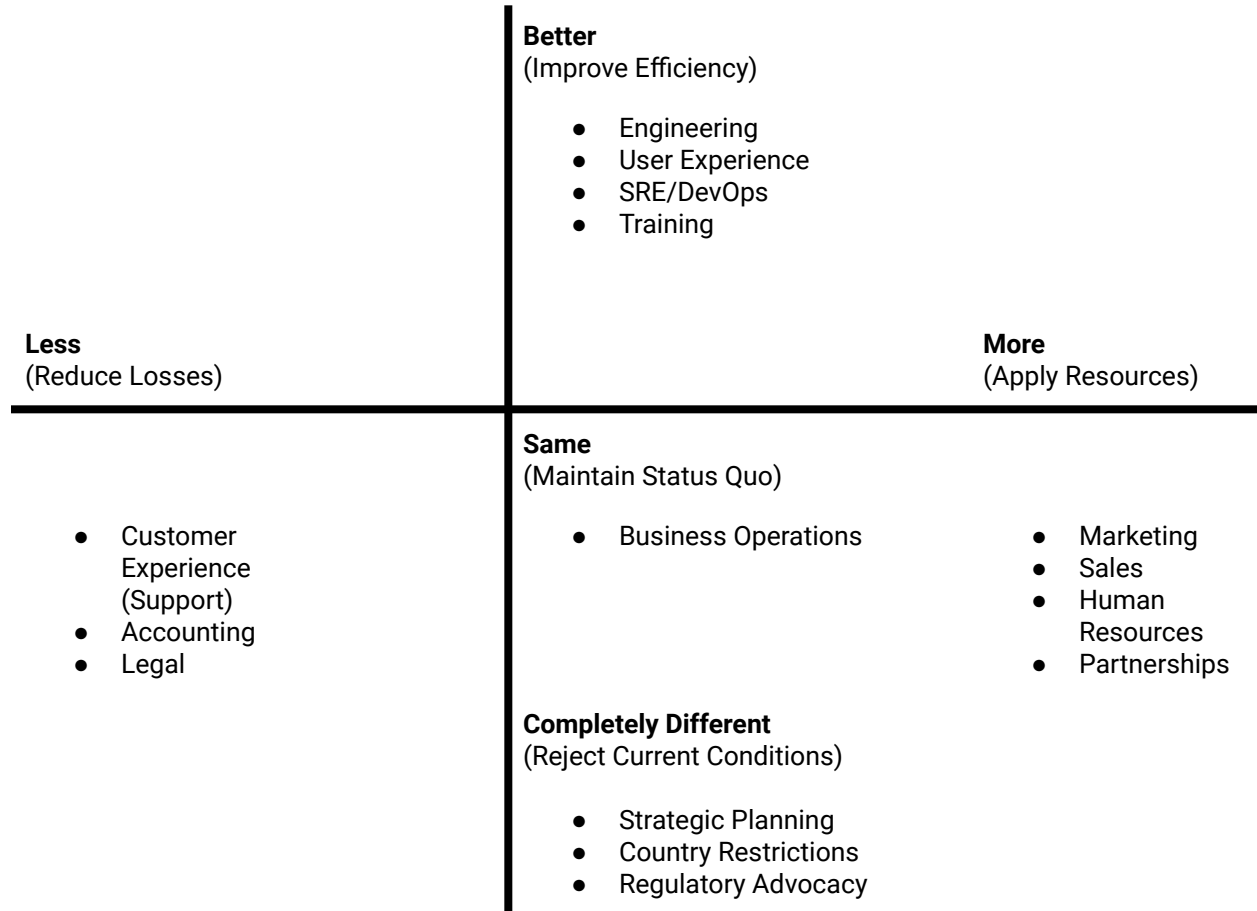
The user experience (UX) discipline provides tools and methods for examining the problem space and identifying the optimal solution for the user and the business. While experience suffers for some products and businesses who think that analysis is too expensive, many businesses have their improved chances of success by adopting lightweight “Guerilla” (sic “Gorilla”) style UX analysis with rapid turnaround and low cost.

If the product issues cannot be resolved, the data gathered can provide the critical insights needed to re-envision the product or service experience. RCAM may help identify blind spots in user experience strategy and problem response.

RCAM Example 6: Implementing regulatory requirements in products and services

Subject: *Fictional* service customers are struggling to implement new regulatory requirements.

Trajectory: Key customers have declared intent to leave unless issues are resolved.



A sampling of departmental participants and potential actions is envisioned in the model above to support a 360-degree view of the problem. These can be replaced with specific details when modeling a problem.

When industry standards or regulatory changes are coming (or have arrived), it can be an “All Hands” response, drawing people from across the business. Marketing and Sales may need to find new clients who are not impacted by the issue. HR or partnerships may need to expand their available expertise. If critical problems cannot otherwise be resolved, seeking regulatory relief or restricting the product market may be deemed necessary but could have substantial risks.

RCAM may help to organize the problem and possible solutions while ensuring a highly democratized process that considers stakeholder input and, in so doing, reduces the potential for blind spots.

RCAM Example 7: Working with AI

AI is not one thing. It is dozens of technologies, evolving with new versions and behavior and underlying data. It is non-deterministic, and can generate different outputs given the same inputs. It may comply with its instructions. It may be firewalled from external data, refreshed periodically, or continuously accessing new information. It may contain biases within its weighting of information. It may produce viable results and non-viable results, and it may not be possible for us to determine which we have been provided.

Response from ChatGPT 4o 2024-08-13:

The text you provided is largely accurate in its description of AI. Here's a breakdown:

[...]

6. **"It may produce viable results and non-viable results, and it may not be possible for us to determine which we have been provided."**

- This is generally accurate but requires some nuance. AI systems can indeed produce both viable and non-viable results. However, determining the quality of the results often depends on the context, the availability of verification methods, and the expertise of those evaluating the output. While it can be challenging to assess the quality of AI-generated results in some cases, it is not always impossible.

Overall, the text accurately reflects the complexities and characteristics of AI systems.

Structured analytic techniques have many uses. When humans interact with AI, structured analytic techniques can be used to provide a common structure to help organize and improve understanding of answers. Structure can also make it easier for us to systematically verify answers are correct or optimal.

Response from ChatGPT 4o 2024-08-13:

Overall, the text correctly highlights the role of structured analytic techniques in enhancing the interaction between humans and AI by improving organization, understanding, and verification of AI-generated outputs.

In the following example, we will use RCAM with generative AI to modulate the AI output. As we open our minds to the way this technology can be used, remember that there are many other ways we can use generative AI, such as sanitizing or presorting input data, and generating exhaustive lists to consider what we might have missed. Working with human-in-loop we remain responsible for the resulting work. AI cannot currently think for you. Understand risks before integrating AI into your analytic process.

Let us consider an overturned boat with people in the water who need to survive.

Responses from ChatGPT 4o 2024-08-13, combined:

When a boat overturns and sailors find themselves in the water, there are several steps they can take to improve their chances of survival:

1. Stay Calm and Conserve Energy
2. Stay with the Boat if Possible
3. Use Personal Flotation Devices (PFDs)
4. Huddle Together
5. Use the HELP Position
6. Protect Yourself from the Elements
7. Signal for Help
8. Stay Aware of Your Surroundings
9. Hydration and Nutrition
10. Prepare for Rescue

Prompt: Consider the situation we discussed where a boat overturns and sailors find themselves in the water. We want to determine how these swimmers can improve their chances of survival once already in the water. Please use RCAM to structure your response. [an earlier RCAM draft was uploaded]

Response from ChatGPT 4o 2024-08-13:

Using the Resource Constrained Action Model (RCAM) to determine how swimmers can improve their chances of survival once in the water after a boat overturns, we can analyze the situation as follows:

RCAM Model

Subject: Survival of sailors in the water after a boat overturns.

Trajectory: Immediate danger due to exposure, potential hypothermia, drowning, or exhaustion.

Same (Maintain Status Quo)

- **Current State:** Swimmers are in the water, likely with limited flotation devices, and may be in a state of panic.
- **Critical State:** Survival depends on being rescued or reaching safety before succumbing to exhaustion, hypothermia, or drowning.

Less (Reduce Losses)

- **Actions to Counteract Losses:**
 - Conserve energy by minimizing movement and staying calm.
 - Stay close to the overturned boat or debris to avoid drifting away.

- Huddle together with other survivors to retain body heat.
- Use the HELP (Heat Escape Lessening Position) to reduce heat loss and stave off hypothermia.

More (Apply Resources)

- **Actions to Replenish or Enhance Resources:**
 - Use any available personal flotation devices (PFDs) to stay afloat and conserve energy.
 - Signal for help using reflective materials, whistles, or any available signaling devices.
 - If there are any nearby resources (floating debris), use them to help stay afloat or climb onto them to reduce exposure to cold water.

Better (Improve Efficiency)

- **Actions to Optimize Survival:**
 - Position yourself in a way that maximizes visibility to rescuers (e.g., stay near the boat, use bright clothing or materials to increase visibility).
 - If possible, reduce water intake by keeping your head above water, especially in rough seas.

Completely Different (Reject Current Conditions)

- **Radical Alternatives:**
 - Attempt to swim to the nearest visible land or object if staying with the boat is not viable (only if you are confident that you can reach it without exhaustion).
 - If hypothermia becomes a significant risk, and no rescue seems imminent, consider using debris or the overturned boat to create makeshift protection from the water.

Estimated Trajectory

- Based on the current situation, the likelihood of survival decreases with time due to the risk of hypothermia, drowning, or exhaustion. Immediate actions should focus on conserving energy and increasing visibility to rescuers.

Packaging Viable Solutions

- **Short-term actions:** Use PFDs, stay close to the boat, and conserve energy by minimizing movement and huddling together.
- **Medium-term actions:** Signal for help continuously, monitor the situation for any nearby rescue opportunities, and be prepared to take more drastic actions (e.g., attempting to swim to safety) if no rescue is in sight and the situation deteriorates.
- **Long-term considerations:** If rescue is delayed, reassess the situation regularly and be prepared to adapt to changing conditions, such as worsening weather or deteriorating physical condition.

Recommendation

- Focus on **Less** (reducing energy expenditure and heat loss) and **More** (maximizing available resources like PFDs and signaling devices) actions to maintain survival until rescue. If the situation worsens without

rescue, consider **Completely Different** actions as a last resort, such as swimming to the nearest land if it seems achievable.

By following these structured steps using RCAM, swimmers can systematically assess their situation and make decisions that maximize their chances of survival in the water.

New options and prioritization have emerged. By directing the conversation to use RCAM, we are now certain that there are options which reduce losses, optimize efficiency, and consider the possibility that more radical options might be the only options viable.

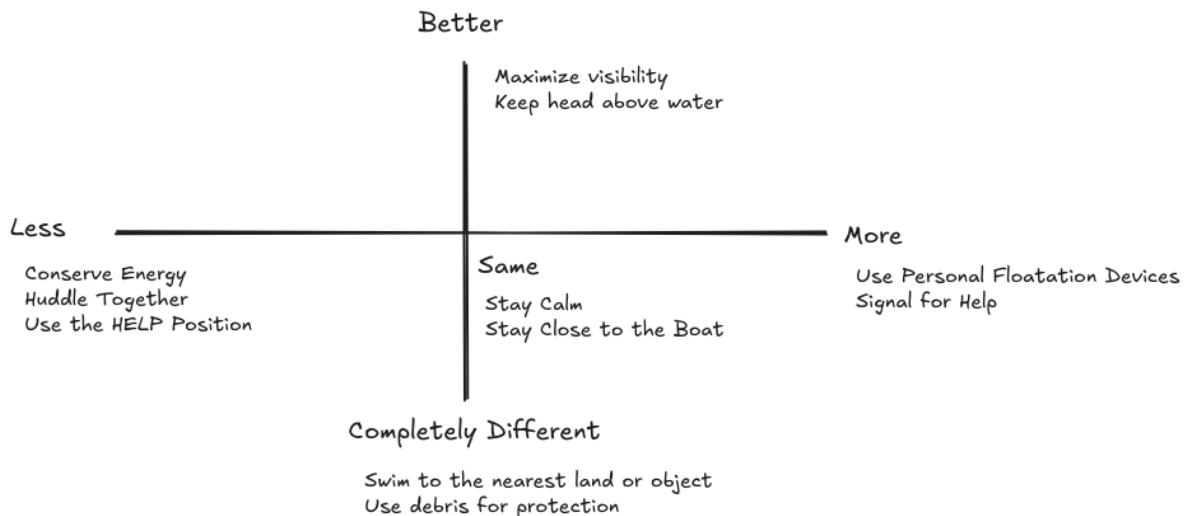
On the date of this interaction, ChatGPT could not successfully diagram the response, but could provide a detailed description of how the response could be diagrammed, with embellishments such as:

The background should depict a maritime scene with an overturned boat partially submerged in the water. The water should be slightly choppy to indicate the difficulty of the situation.

The following simple diagram was prepared with Excalidraw (excalidaw.com). An imprecise font was selected to represent the imprecise nature of this first draft.

RCAM: Sailors in Water After Boat Overturms

Trajectory: Immediate danger due to exposure, potential hypothermia, drowning, or exhaustion.



Working with RCAM models

Updating a Model

Some environments allow or require a prior analysis to be revisited when conditions change. This may be triggered by monitoring the current status, which indicates that a point of criticality has been reached, that the point of criticality has been averted, that inputs have changed, or that solution viability has changed. We will refactor and communicate.

1. Make a new copy of the model.
2. Based on what changed, identify the first step of the process that needs to be repeated.
3. Copy from the prior model to the new model up to the step that needs to be repeated.
4. Repeat all subsequent steps, seeding the new model from the old model while adjusting to reflect the needed changes. Some data from the old model may no longer be relevant and should be omitted. Consider that new data may be available. Consider that new ideas may be generated. Consider that existing ideas may become viable or non-viable based on the change in conditions.
5. If there is a resulting change in recommendation, communicate what triggered the model update and the resulting change.

Quality Considerations

When significant problems strike, the problem might be seen from many different perspectives, each with different data. We can benefit when we broadly consider who can provide relevant data.

By tracking not just the evidence but the source of evidence used in decision making, we can corroborate different data sources to increase trust in the evidence, change to a more authoritative data source, or know where to source updated data to reflect changes in the problem.

As decisions are implemented, RCAM enables project teams to know what was known at the time of the decision. This knowledge capture can help identify possibly new conditions requiring disclosure to the approver.

Correct Categorization

RCAM is a MECE model. MECE means Mutually Exclusive, Comprehensively Exhaustive. In a MECE model, an item can be categorized in exactly one category, categories are non-overlapping, and categories cover all possibilities. The rigid MECE structure allows RCAM to resist premature closure bias because we can observe if one category is loaded with ideas while another is empty.

When categorizing, the axes and origin definitions are the primary sources for disambiguating correct item placement. The origin is about maintaining the status quo or understanding the problem. The horizontal axis is about resource management. The vertical axis is about the impact produced using the resource.

If an idea would add to the constrained resource, it is **More**, while if it would use the constrained resource to achieve greater things, it is **Better**. If an idea aims to reduce customer attrition, that is **Less**, while if we need fewer customers to achieve the same outcome, it is **Better**. If we are changing how we collect information about the problem, it is **Same**. If we are making a revolutionary change, it is **Completely Different**, while any evolutionary changes would be in the other categories.

Model Fill Brainstorming

RCAM's model can be used in brainstorming, independently of the structured analytic technique. The labels or categories in a model can be used to guide our brainstorming. When the model is a MECE (Mutually Exclusive, Comprehensively Exhaustive) model like RCAM, and we place at least one idea in each category, we can enforce a level of idea diversification. When working alone on a time-critical problem, RCAM can provide a helpful structure to our mental brainstorming or think-aloud brainstorming. **More, Better, Less, Same, Completely Different.**

Past and Future Problems

While RCAM can be used to think about problems we are currently facing, RCAM can also be used to reconsider past problems or consider potential future problems. In our AI example, we considered how sailors could respond if they were in the water. While RCAM can be used to size up a problem quickly, it is better to think about low-likelihood/high-impact scenarios like this in advance. If a problem has been experienced previously, actual data may be available to support a more robust analysis.

User Interfaces

In our astronaut air leak example, we used sample data about air pressure and reserves. We considered options like sealing off parts of the ship or reducing air usage. Critical situations like an air leak on a rocket ship likely require very rapid evaluation and action. If our astronaut needs to collect data from various systems manually and then manually manipulate those systems to implement the desired changes, time overhead may become a factor in determining the actions they can take before they run out of air. By modeling a complex problem response in advance, the user interfaces of the rocket ship could be designed to place situationally relevant information close at hand and to provide access to the automation of relevant actions. The astronaut would be well-positioned to focus on the problem and take the necessary actions if they can override defaults and also perform actions manually.

Recognizing Resource Problems

RCAM is optimized for resource problems. What are some indicators that a problem is a resource problem?

Qualitatively, describing the problem in words, resource problems might be expressed in dire terms about resource criticality, bounds, limits, or limitations. The resource may have a description like customers, time, or money.

- "We are losing too many customers."
- "We are facing a shortage."
- "We have too much inventory on hand."
- "The project cannot be completed on time or budget."
- "Acquisition costs are too high."
- "We should be generating more revenue per customer."
- "We are running out of capacity or reserves."
- "Existing initiatives do not address the underlying limits."
- "We are bleeding money."

Quantitatively, describing the problem in numbers, resource problems might be expressed in dire numbers that only the management team and specific experts understand without explanation.

- Percentages or numbers above or below an accepted threshold, such as acceptable risk
- Numbers that deviate from historical norms
- An unacceptable rate of change, characterized by a frequency such as hours or months
- A trend that reflects a movement toward a problematic condition

The trigger for problem response can vary. In some cases, the response may begin when the business implements or enhances its measurement or monitoring program, discovers that its prior understanding of a situation was incorrect, and determines action is warranted.

In other cases, the response begins when current conditions are not understood. People often fear the unknown. It is difficult to determine how much time is available for response without an understanding of current conditions and the runway to criticality. It may be necessary to rapidly size up the current situation, determine how bad the problem is, and then enhance that understanding during response.

The response to some problems begins from an already critical state. The status quo may represent a point where criticality has already been reached, and some actions may already have been taken. It is vital in these cases to understand what has already been tried, the impact of these actions, and evaluate any unintended consequences. This consideration can help guide more successful subsequent action.

For overt problems (like our astronaut), the resource involved is clear (an air shortage). For business problems, the resource involved may be less clear. Consider what records are the key records in the business database, how customers are billed, or what the business is in the business of doing. Is this an inventory problem? A business selling widgets might have a resource constraint on sellable widgets.

Remember that not every condition is an emergency or a problem. Change happens continuously. Our ability to accept or adapt is a critical factor. Awareness of conditions can trigger alarm when everything is okay. RCAM can help us to consider whether we are facing a genuine concern or something regular.

Implementing RCAM

Managing Risk in the Unknown

What we know and what exists are examples of positive space. Examples of negative space are what we do not know and what does not exist. Unknowns dwell in the negative space, whether we are aware of them or not.

When acting on resource problems, changes that reduce losses (**Less**), apply resources (**More**), or make improvements (**Better**) are usually either understood or understandable. These actions build on something that already exists. We typically know that we can depend on our existing domain knowledge or are aware that domain knowledge is insufficient or no longer available.

If, instead, we determine that the situation is unworkable, that we must reject the current conditions and do something **Completely Different**, we are stepping into the unknown. This action has the gravity of taking the nuclear option, accepting that the grass is only greener on the other side, that the baby can be emptied with the bath water, that we can trade the customers we have for the customers we want, that the extreme choice is the right choice, that we have the moxie to make this decision and the resolve to stand by it with all resulting consequences. The **Completely Different** option should not be taken lightly.

It is not always safe, viable, or beneficial to reject problems and accept an entirely new set of problems. Conditions could improve, could become worse, but at best are unknown.

Where we had domain knowledge in our current problem, taking a **Completely Different** option, we may have gaps in domain knowledge if everything is different, and we may not know what we do not know (unknown-unknowns). We may not be equipped to execute the new strategy, which may take longer. Our competitors may not have these same blind spots, and they may already understand the hidden constraints we are blissfully ignorant. Our existing customers and employees might not understand the pivot. We may be unable to make these changes concurrent with operating the current business. Fear, uncertainty, and doubt abound. However, then again, it might be marvelous.

This is a time to consider risks carefully within the decision-making process.

- What do we know we do not know? (known-unknowns)
- What are the critical conditions for success or failure?
- What is the critical path to success?
- What are the pitfalls that could shift us from success to failure?
- Have we asked domain experts for their feedback?
- Have we listened carefully to the feedback we have received?
- What don't we know? Where are the risks? If we are not sure, who can tell us?

RCAM and SWOT

SWOT Analysis is a structured analytic technique broadly used in business and analytic environments. With this technique, data and ideas are classified into the categories of Strengths, Weaknesses, Opportunities, and Threats.

RCAM is a structured analytic technique designed for resource problems. With this technique, data and ideas are classified into the categories of **More, Better, Less, Same, and Completely Different**.

SWOT and RCAM have several shared benefits, and both are:

- **Rapidly deployable**, depending on only minimal instruction and tooling;
- **General purpose**, capable of working with diverse problems, scope, and scale;
- **Collaborative and democratized**, supporting consensus from stakeholders; and
- **Produce strong visual artifacts**, enabling participants to recognize meaning at a glance.

SWOT has characteristics that RCAM is designed to mitigate:

- **SWOT inputs are variable and not repeatable.** SWOT inputs are unstructured and depend on participant domain expertise to determine relevant inputs. This variability can produce an imbalanced view based on the biases of participants. Further, if the exercise is repeated, results may depend on substantially different inputs and resultant conclusions, and the cause for this deviation may not be detectable. Instead, RCAM collects resource constraint-specific conditions, memorializes these details, and enables both repeatability and change detection.
- **SWOT does not require evidence.** The SWOT process does not inherently encourage the integration of empirical evidence over anecdotes. This lack of real data can mask the scale of the problem, the overhead of implementing a potential solution, and the time imperative. RCAM instead considers resource criticality and diverse factors in determining solution viability to produce solutions that better align with ground truth.
- **SWOT categories can overlap.** The SWOT process permits overlap, and these overlaps may indicate a synergy that can be exploited to generate value. However, in practice, this overlap can also cause difficulty or disagreement in groups based on the different optics of participants. RCAM instead uses strong definitions and MECE categories to prevent overlaps. RCAM leverages this non-overlap to resist cognitive biases and to help identify evidence gaps.
- **SWOT generates lists, not actions.** The SWOT process, even when correctly tied to a goal, produces unconstrained lists of ideas that do not necessarily translate into clear next steps, such as research or implementation. After a long SWOT session, many groups walk away with just a list of ideas. RCAM instead memorializes key aspects of the problem space and provides decision support to make plans actionable.

RCAM can be used in several ways to overcome the limitations of SWOT:

RCAM only	For resource problems, use RCAM as an alternative to SWOT.
RCAM then SWOT	Use RCAM first to evaluate a resource problem, then constrain the SWOT exercise to a scope that explores or evaluates the relevant RCAM findings.
SWOT then RCAM	Use SWOT first, then use RCAM to focus on an identified resource problem and produce an actionable recommendation.

Mapping to RCAM

RCAM can be implemented as an initial analytic or after some analysis has already occurred. When an ideas list already exists, the list of synonyms below can be used as an expedient map of keywords to RCAM categories.

After an initial sort, corrections will be needed. **More** and **Less** items relate to the management of the constrained resource; **Better** and **Completely Different** items relate to the impact generated from the resource; and the **Same** items relate to existing conditions.

Keyword	Category Guess
Acquire	More
Adapt	Better
Adopt a new market	Completely Different
Adopt a new use case	Completely Different
Amplify	Better, More
Assess	Same
Assign	More
Assume	Completely Different
Build	Better
Cannibalize	Completely Different
Conserve	Less, Same
Create a new line of business	Completely Different
Create a new product	Completely Different
Create a new service	Completely Different
Defer	Same
Delay	Same
Deprioritize	Completely Different, Less
Enhance	Better
Expand	More
Experiment	Completely Different
Hire	More
Improve engagement	Better
Improve experience	Better
Improve longevity	Less
Improve a product	Better

Improve a relationship	Less
Improve service	Better
Include	More
Keep	Less, Same
Know	Same
Market	More
Measure	Same
Merge	Completely Different
Monitor	Same
Omit	Less
Optimize	Better
Prevent	Less
Prioritize	Better, More
Promote	More
Purchase	More
Reduce waste	Less
Reject	Completely Different
Retain	Less, Same
Revolutionary	Completely Different
Satisfy	Less
Shut down	Completely Different
Speculate	Completely Different
Stagnate	Same
Support	Less
Understand	Same
Wait	Same

Suggested Resources

- “SWOT Analysis” Wikipedia article,
https://en.wikipedia.org/wiki/SWOT_analysis
- “Structured Analytic Techniques for Intelligence Analysis”, 3rd ed., Pherson and Heuer
- “8 Types of Waste: DOWNTIME”,
<https://www.calhr.ca.gov/Documents/8-Wastes.pdf>

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