Decision-Making, Risk, and Radical Uncertainty



Source: Midjourney Prompt: A person wearing a white shirt with a cloud-like design on the head, against a sky-blue background. In the style of Rinko Kawauchi and Ren Hang.



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December 2024



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Case Study

Robust decision-making against traditional values



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Let's consider an example of a decision made under conditions of extreme uncertainty, with potentially hundreds of lives on the line

Background - what was known

- Fudai, a small village of 2,600 people in northeastern Japan suffered two devastating tsunami-related floods in 1896 and 1933, caused by a **magnitude 8.5 and 8.4** earthquakes respectively
- These past events had claimed the lives of hundreds of residents
- Kotoku Wamura, mayor of Fudai from 1945 to 1987, resolved to protect his town from future tsunamis by building a robust seawall and floodgate system
- The floodgate would represent a **significant investment** of ¥3.6B (~AUD66M today), for a small village of less than 3,000 people



Kotoku Wamura, mayor of Fudai from 1945 to 1987. Source: CTV News



2011 Tsunami Fudai aftermath. Source: Structural Measures against Tsunamis

Problem - what was unknown

- Many residents and officials dismissed Wamura's plan as excessive, given the *perceived uncertainty* of another tsunami of the magnitude seen in 1933
- Additionally, the likelihood of a new worst-case scenario was *unknown* and *unknowable*
- While flood protection was broadly supported, the proposed size and scale of the floodgate led to public doubt and criticism

Today's context

Financial pressures facing organisations today



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A combination of financial pressures are facing many organisations today...



High interest rates



Poor consumer sentiment



Insights

"The environment has a profound effect on what works and what doesn't..."

- Howard Marks

 A range of macroeconomic indicators suggest that the environment is different now to what it has been for decades

 This suggests that we may have to adjust our thinking and action to suit the changed environment

Source: ABS; RBA

Australia's low Economic Complexity compounds these challenges, emphasising system fragility

The Economic Complexity Index measures the diversity and sophistication of a country's productive capabilities and ranks them against other countries

Economic Complexity Index



Source: Harvard Atlas of Economic Complexity

A higher rank indicates a diversified economy with more advanced

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Insights

- Australia's rank indicates a • low level of economic complexity for a highly developed nation
- This reflects our heavy • reliance on raw material exports, which in turn makes our economy vulnerable to commodity price fluctuations and geopolitical tensions
- It highlights challenges in • transitioning to a knowledge-based economy and creating industries that can sustain long-term growth and competitiveness

Fragility in organisations

The importance of robust and resilient decision-making





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Given the current economic context, many organisational fragilities are being exposed



Source: ABS

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Taleb (2007) introduces a concept of *fragility*, where systems may appear to be stable but are highly *vulnerable* to shocks or stress due to hidden weaknesses



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According to Taleb (2007), fragility can be driven by various factors, including: Size, Complexity, and Concentration

Size	Complexity	Concentration	
Large entities centralise resources amplifying single point of failure	Larger systems become "opaque," with interactions that are difficult to predict or control	Centralisation creates single points of failure	
Large systems inherently resist adaptability	Opacity prevents effective risk management	Poor centralised processes reduce redundancy and safety nets	
The interconnectedness of large entities can create cascading failures	Decision-makers use models that oversimplify complex interdependencies	Concentrated influence magnifies systemic vulnerabilities	
Large entities cannot proportionately scale their buffers or redundancies	Decision-makers often mistake complicated models for true understanding, failing to grasp the limits of their knowledge	Siloed resources intensify the impacts of unknown unknowns	

Fragility arises from nonlinear effects, where apparently small changes in a system can have significant negative impacts

For Taleb (2012), fragility exists on a continuum from the fragile to the antifragile *Robustness is not the opposite of fragility, merely its absence*

Fragile (Hates Uncertainty)

• Vulnerable to significant negative effects from uncertainty

Example:

Organisation A:

- Narrow product offer
- Long lead time to bring new products to market

Organisation A is fragile with respect to shifts in consumer demand

If demand shifts away from its current product offer, it has a long period of non-profitability before it can again meet the market

Robust (Impervious to Uncertainty)

 Minimal vulnerability to uncertainty, but no capability to take advantage of it either

Example:

Organisation B:

- Broad and diverse product offer
- Long lead time to bring new products to market

Organisation B is robust with respect to shifts in consumer demand

If demand shifts away from one product, its other products keep it profitable while it develops a new product

Antifragile (Loves Uncertainty)

• Able to derive significant benefit (positive effects) from uncertainty

Example:

Organisation C:

- Narrow product offer
- Short lead time to bring new products to market

It is antifragile with respect to shifts in consumer demand

If demand shifts, it quickly deploys a new product, gaining market share from its less agile competitors



Similar to Taleb's (2012) principle of *antifragility*, Anthea Roberts suggests *resilience* in the face of radical uncertainty (see anthearoberts.com/risk-reward-resilience)

Resilience encompasses not only the capacity to absorb shocks but also the ability to adapt and transform in response to change

Absorptive Capability

- The ability of a system to withstand shocks and maintain functionality without undergoing significant changes
- This can involve having reserves, buffers, or redundancies in place to mitigate the impact of disruptions
- E.g., stockpiling essential goods or maintaining financial reserves can enhance absorptive capacity in the face of supply chain disruptions or economic shocks

Adaptive Capability

- The ability of a system to respond to changes by making adjustments to its processes, structures, or strategies while preserving its essential purpose and structure
- This involves learning from experience, experimenting with new approaches, and being willing to pivot when necessary
- E.g., businesses with diversified supply chains are better positioned to adapt to geopolitical risks

Transformative Capability

- The ability to fundamentally alter the system's structure and incentives to move to a new state, often in response to significant disruptions or shifts in the environment
- This may involve abandoning outdated practices, embracing new paradigms, or shifting to entirely different operating models
- E.g., the transition to a clean energy economy requires a transformative shift in infrastructure, technologies, and societal behaviours

It's important to note that these drivers of resilience are not mutually exclusive and often operate in conjunction with one another



By integrating insights from both Taleb (2012) and Roberts (2020), it becomes clear that resilience has a crucial role in achieving sustainable success in a world characterised by uncertainty

Resilience depends on the interactions within and across all levels of a system

- Multiple (redundant) connections between parts enhance adaptability and recovery
- Redundancy and diversity within subsystems prevents cascading failures
- Individual resilience contributes to organisational and systemic stability
- Cross-level feedback loops ensure alignment and responsiveness
- Ecosystem-level resilience requires balancing local autonomy with global cooperation
- Monitoring and nurturing weak links can prevent systemic vulnerabilities

There can be trade-offs and unintended consequences

- Short-term optimisation can erode resilience by reducing adaptability
- Excessive efficiency measures may limit diversity and flexibility
- Interventions to enhance resilience in one area can create risks elsewhere
- Protective policies may weaken individual entities and introduce systemic fragility
- For example, excessive focus on short-term efficiency or optimisation can undermine resilience by reducing diversity, flexibility, and the capacity to adapt to unexpected events



Some concepts on risk and uncertainty





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The economic situation clearly exposes us to considerable uncertainties

- Will we manage inflation?
- Will the new US administration impact our trade flows?
- Will we fix our productivity problems? If not, are there other ways we can manage inflation?
- Will we avoid a recession?
- Can we build enough housing?
- Will employment remain robust?
- Can we escape a per capita recession?
- Will there be a change of Australian government? Will its activities be inflationary?
- Will technology help us manage our productivity problem?





But what is an uncertainty?

- Risk is an uncertain event or condition that, if it occurs, has a negative impact on the project
- It can be caused by both external or internal vulnerabilities and may be avoided through preemptive action
- Risk is assessed based on two factors:
 - likelihood of occurrence; and
 - the consequence or **impact** on the project



Quantifiable Risk

- Situations where the potential outcomes can be measured
- Quantification of risk allows for the development of relevant business plans and mitigation strategies
- For example, financial risk, cyber risk, supply chain risk

Unquantifiable Risk

- Unknown unknowns and unknowable situations where outcomes are unpredictable and cannot be measured
- For example, black swan events, tech disruptions, climate change



At Bevington Group, we categorise events as *Certainties*, *Risks*, and *Uncertainties* to guide decisionmaking



Knight, F. (1921). Risk, Uncertainty, and Profit Taleb, N. (2007). The Black Swan Kay, J. & King, M. (2020). Radical Uncertainty

Concepts for navigating radical uncertainty

- a) Leverage fragility drivers
- b) Use open and locked path decision-making
- c) Decompose and reason narratively
- d) Plan for multiple scenarios

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e) Build in targeted redundancy

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Managing fragility drivers under uncertainty





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Considered analysis of size, complexity, and concentration can highlight fragility drivers within an organisation

Examples of fragility					
Size	Complexity	Concentration			
• Decision-making concentrated in a few hands, increasing single points of failure	• Lack of clarity in processes, roles, or decision-making, hindering effective management	 Decision-making power resting with a few key individuals, creating bottlenecks and 			
• Difficulty adjusting to market or environmental changes due to rigid structures	 Failure to account for complex interdependencies or risks, often leading to unforeseen 	 dependency risks Over-reliance on specific people, teams, or suppliers, 			
• Over-reliance on poor processes or departments, making failure in one area impact the entire organisation or function	 consequences Decision-making based on inaccurate or incomplete models that overlook important variables 	creating vulnerabilities if they fail or leave			
 Insufficient buffers or redundancies to handle unexpected disruptions 	• Prioritising efficiency over resilience , eliminating backup systems or redundancy				

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A value driver tree maps relationships and visualises cause and effect This makes it a good tool to identify potential drivers of fragility



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Some concepts for making decisions under uncertainty - Part 1

Make appropriate use of open and locked path decision-making

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Breaking down decisions into two types The Amazon approach



- These decisions are **consequential** and **irreversible** (or nearly irreversible)
- They should be made methodically, carefully, slowly, with great **deliberation** and **consultation**
- This approach **naturally reduces fragility and mitigates cognitive biases** by evaluating potential risks, managing resilience, and minimising vulnerabilities
- However, there is additional **opportunity risk** with slow decision-making
- The irreversibility of these decisions underscores the importance of scenario modelling, narrative reasoning, and considering non-linear risks



- These decisions are **changeable** and **reversible**, meaning they are inherently less risky
- Taleb suggests that small, low-stakes failures can strengthen overall systems and if you've made a suboptimal decision, you can "reopen the door and go back"
- This approach encourages a bias for action to **enable rapid learning** and **adaptability**
- Open path decisions are typically focused on rewards which leverages optionality, where the potential upside is openended, while the downside is limited and managed
- The inherent flexibility reduces the need for exhaustive risk analysis, making it suitable for environments where data is incomplete, or outcomes are uncertain

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• These decisions can be made by high-judgement individuals or small groups

Source: Amazon shareholder letter 2016, https://www.sec.gov/Archives/edgar/data/1018724/000119312516530910/d168744dex991.htm (accessed July 2024)



Beware of risk-reward profiles where the downside is predictable and limited, while the potential upside is open-ended - these are actually good risks to take (a principle of Risk Intelligence)

- Watch out for an asymmetric risk-reward profile
- The downside is predictable and limited, meaning that even if things go wrong, the losses are contained and manageable (this is a key concept in Taleb's work)
- The upside is open-ended, where the potential for rewards can be much larger than the risks involved
- For example, in venture capital, most startups may fail, but the few that succeed could provide substantial returns, far exceeding the losses from failures
- These decisions encourage a mindset of opportunity, where the focus is on growth and experimentation, knowing the risks are bounded



Large organisations often fall into the trap of applying locked path decision-making processes universally, including for reversible decisions

Decision-making misclassification

Slows decision velocity

Stifles experimentation

Undermines innovation

Amplifies fragility

- Locked path decisions necessitate greater caution due to their irreversible exposure to threats, vulnerabilities, and downstream consequences
- Decision-makers should:
 - Focus on risk mitigation strategies, including deep scenario planning, modelling potential worst-case outcomes, and building in redundancy and flexibility
 - Avoid over-optimisation or the removal of safety nets, recognising that robustness and resilience are crucial to handling the unpredictability of large-scale consequences
 - Carefully assess vulnerabilities and interdependencies, understanding that **small failures can propagate** and cause far-reaching damage

- For open path decisions, the focus should shift to opportunity rather than risk, recognising that hazards are more controllable, and exposure is temporary
- Decision-makers should:
 - Recognise that in open path decisions, the potential for failure is often an opportunity to learn, adapt, and improve rather than a catastrophic event
 - Take calculated risks
 - Focus on adaptability and innovation, testing hypotheses and experimenting with new models or approaches that may offer asymmetric and substantial rewards
 - Adjust strategies based on evolving information to stay ahead of potential threats or inefficiencies

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Categorising Decisions

- Have a system in place for categorising decision as locked path or open path
- Define clear processes for each type of decision
- Define clear decision-rights
- Different decision processes may be optimised differently, e.g., for
 - Speed
 - Risk
 - Innovation
 - etc.
- Standardise assessment / categorisation dimensions to improve consistent assessment
- Ensure feedback loops are in place to test outcomes of decisions and facilitate continuous improvement of the decisionmaking processes

Educating managers on decision making can help ensure that Type 1 and Type 2 decisions are handled appropriately, but process change is also necessary



Locked Path

("Type 1" Decisions)

- Do your research
- Explore different options and scenario-model accordingly
- Evaluate and quantify risk and uncertainty
- Decide rationally and carefully
- Involve others to help mitigate biases



Open Path

("Type 2" Decisions)

- Decide and execute quickly
- Have a bias for action
- Leverage experience
- Delegate where appropriate

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- Monitor the outcome
- Pivot if required

Source: Amazon shareholder letter 2016, https://www.sec.gov/Archives/edgar/data/1018724/000119312516530910/d168744dex991.htm (accessed July 2024)



Some concepts for making decisions under uncertainty - Part 2

Decompose and reason narratively





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In a world where uncertainty cannot be definitively quantified, narrative reasoning can provide a sensible basis for action

- Kay and King (Radical Uncertainty, 2020) emphasise the importance of understanding context and using narrative reasoning to navigate environments of uncertainty
- Their approach, centred on the question "What is going on here?", reflects a rejection of over-reliance on probabilistic models and a shift toward situational awareness and incremental decision-making
- These narratives provide a coherent framework for navigating uncertainty, **aligning actions with evolving contexts rather than static plans**
- By evolving narratives in response to new information, decision-makers ensure strategies remain adaptable, relevant, and reflective of emerging realities
- Incremental steps, coupled with narrative reasoning, create continuous feedback loops
- These loops allow leaders to refine their approach, reducing the impact of incorrect decisions while building organisational resilience



Decompose locked path decision into smaller open path decisions, combined with narrative reasoning





Plan for multiple scenarios





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To strategically respond to risk and radical uncertainty, it is useful to understand what approaches can be deployed in multiple situations. Scenario planning is helpful for this

• Made famous by Royal Dutch Shell Company when they outperformed their competitors in spite of (or because of) a major oil shock

Scenario planning is a way to synthesise enormous amounts of trend data into a vision of what might be possible - most likely multiple visions

In essence it simplifies "an avalanche of data into a limited number of strategic themes"

The focus shifts from exhaustive prediction to constructing actionable and adaptive strategies based on the most critical insights

By preparing multiple scenarios it is possible to pick the critical strategic themes that might lead to enhanced resilience

It helps manage for both overprediction (e.g. I thought we would have colonised Mars by now!) and underprediction (e.g. Amazon becoming a global retail powerhouse from its start as a bookseller!)

Essentially

Build the scenarios

Find the themes

Invest for profit or resilience



Scenarios will need to be built at multiple levels - understanding your context helps you to build better strategies



... and many more questions

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Build in targeted redundancy





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Taleb (2012), Kay and King (2020), and Roberts (2020) all underscore the idea that redundancy, when applied thoughtfully, is *essential* for building resilience in the face of uncertainty and volatility

- There is a tendency for organisations to optimise and reduce redundancy for maximum efficiency redundancy is often viewed as wasteful or inefficient
- Roberts emphasises that resilience depends on the ability to **anticipate**, **absorb**, **and recover from disruptions**. Redundancy is central to this capability
- Taleb highlights that redundancy contributes to *antifragility*. Redundant elements, such as backup resources or slack in operations, **act as buffers against shocks**
- Kay and King argue that **redundancy enables flexibility**, where outcomes cannot be predicted or probabilities reliably calculated

Diversity as redundancy	Dynamic and modular redundancy	Dual-use redundancy
 Taleb highlights the value of redundancy in diversity Diverse teams, systems, or portfolios offer multiple ways to solve problems, mitigating risks associated with over-reliance on a single solution 	 Kay and King advocate for modular systems where redundant elements can be activated selectively Redundancy should not be static, and it must evolve with the organisation's context and priorities 	 Roberts suggests designing redundancy to serve multiple purposes Resources allocated for redundancy can be leveraged for continuous improvement, innovation, or capacity-building in normal conditions, ensuring they remain value-adding

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Case Study

Robust decision-making against traditional values

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Case study recap: Let's consider an example of a decision made under conditions of extreme uncertainty, with potentially hundreds of lives on the line

Background - what was known

- Fudai, a small village of 2,600 people in northeastern Japan suffered two devastating tsunami-related floods in 1896 and 1933, caused by a **magnitude 8.5 and 8.4** earthquakes respectively
- These past events had claimed the lives of hundreds of residents
- Kotoku Wamura, mayor of Fudai from 1945 to 1987, resolved to protect his town from future tsunamis by building a robust seawall and floodgate system
- The floodgate would represent a **significant investment** of ¥3.6B (~AUD66M today), for a small village of less than 3,000 people



Kotoku Wamura, mayor of Fudai from 1945 to 1987



2011 Tsunami Fudai aftermath. Source: Structural Measures against Tsunamis

Problem - what was unknown

- Many residents and officials dismissed Wamura's plan as excessive, given the *perceived uncertainty* of another tsunami of the magnitude seen in 1933
- Additionally, the likelihood of a new worst-case scenario was *unknown* and *unknowable*
- While flood protection was broadly supported, the proposed size and scale of the floodgate led to public doubt and criticism

The floodgate illustrates how robust planning and investment in resilient operating models can provide resilience against radically uncertain events like tsunamis

Response

- Embracing radical uncertainty
 - Predicting the exact timing or magnitude of a future tsunami was *impossible*
 - Kotoku Wamura accepted the 'Unknown Unknowns' of when and how big
 - He focused on **managing radical uncertainty** by designing a solution capable of **mitigating the worst-case scenario**
- Judgement over prediction
 - Wamura's decision to build the floodgate was not based on predictive certainty but on a deep understanding of historical patterns and the potential for catastrophic outcomes
 - By applying *narrative reasoning*, he crafted a plausible scenario of a devastating tsunami and planned accordingly.
- Prioritising resilience and optionality
 - This increased the **robustness** of the town which is now more **resilient**

Outcome

- 14 years after Kotoku Wamura passed, a **9.0** earthquake triggered a 66-foot tsunami along Japan's northeastern coast
- Most neighbouring villages were devastated, but Fudai was spared significant damage
- The seawall and floodgate held back the tsunami
- The town's homes, infrastructure, and livelihoods remained largely intact, and the community quickly resumed its fishing and agricultural activities, avoiding the long-term economic collapse experienced by other towns

Lessons

- Wamura utilised **narrative-based scenario planning**, asking "What would happen if the worst-case scenario occurred?"
- This emphasised strategic foresight and scenario planning rather than assuming a "business as usual" trajectory
- Invest in **redundancy and resilience over optimisation** through long-term thinking, even when immediate payoffs are unclear
- Balance high initial costs with long-term security that provided immeasurable value when the worst-case materialised

Operationalising Antifragility





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As the need for resilience grows, we recommend embedding antifragility into the operating model This requires a holistic approach to Target State Design, considering all elements, not just structure



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Recognising the value of risk and decision-making principles is important, but to unlock that value, our operating model must support their application

Organisation Design Risk & Resilience Model

- Define a framework for recognising, assessing, and adapting to risks as opportunities
- Establish scenario planning and stress-testing as routine practices

Disciplines & Governance & Decision-Oversight Making

- Create adaptable governance structures that allow for swift decision-making in volatile contexts
- Adopt principles that distinguish reversible (open path) from irreversible (locked path) decisions

Information & Metrics & Data

- Prioritise leading indicators that capture emerging risks and opportunities and avoid an over-reliance on lagging metrics or overconfident forecasts
- Develop a clear data governance framework to ensure quality, availability, and security



Service & Process Design & Policy

- Policies should enable devolved decisionmaking at the coalface and provide clarity on where locked or open path decisions applies
- Ensure processes align with devolved decision-making and prioritise adaptability

Infrastructure Automation & AI

- Leverage AI to support complex decisionmaking, identifying patterns and providing foresight
- Al transforms, designs, codes, and tests in time it drastically alters all other operating model elements

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People & Cu Partnerships

Culture & Capability

- Define the right capability and skills mix in each function
- Redesign roles and teams to facilitate cross-functional collaboration and agile decision-making
- Reinforce adaptability and antifragility culturally

Organisations should balance rewards with risk and resilience by leveraging asymmetric payoffs, fostering antifragility, and ensuring accountability and capability alignment

Balance risk, reward, and resilience

- A narrow focus on rewards without considering risks undermines resilience
- Prioritised metrics and overlooked areas need reevaluation for systemic risk
- Asymmetric payoffs highlight fragility (more downside) or antifragility (more upside) and decision-making should balance "what we can gain" with "what we can lose"

Build antifragility through structure

- Effective structures promote decentralised decisionmaking and employee empowerment, whilst rigid or overly centralised structures increase vulnerability to disruptions
- Adaptable, agile structures foster antifragility, turning volatility and uncertainty into opportunities

Develop organisational capabilities

- Internal capabilities need to be assessed to identify gaps for opportunity realisation
- The key to transforming an organisation into an antifragile entity lies in strengthening the resilience of its employees
- By developing a workforce that is adaptable, capable of learning from setbacks, and able to thrive under stress, the whole organisation becomes more robust and able to benefit from uncertainty and challenges

Leverage accountability and incentivisation

- Some systems create antifragility for a few while transferring fragility to others
- "Skin in the game" ensures decision-makers face the consequences of their actions
- Structures and regulations should incentivise responsible actions and discourage risk transfers

And, of course, we are here to help if you need it...

If you have any additional questions or require further information, please contact

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This presentation and related articles will be available for viewing at <u>www.bevingtongroup.com</u>

We look forward to seeing you at our next webinar



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