RISK INSIGHTS

Jamaica Civil Aviation Authority's Digital Risk Management Newsletter

VOLUME 9 | SEPTEMBER 2023

ORGANISATIONAL RESILIENCE & DISASTER RECOVERY

Embracing the challenge of resilience!!

Source: AdobeStock

Risk Insights explores the challenges of resilience programmes and the considerations for enhancing mitigation strategies.

INSIDE

RESILIENCE

Explore With Us.....

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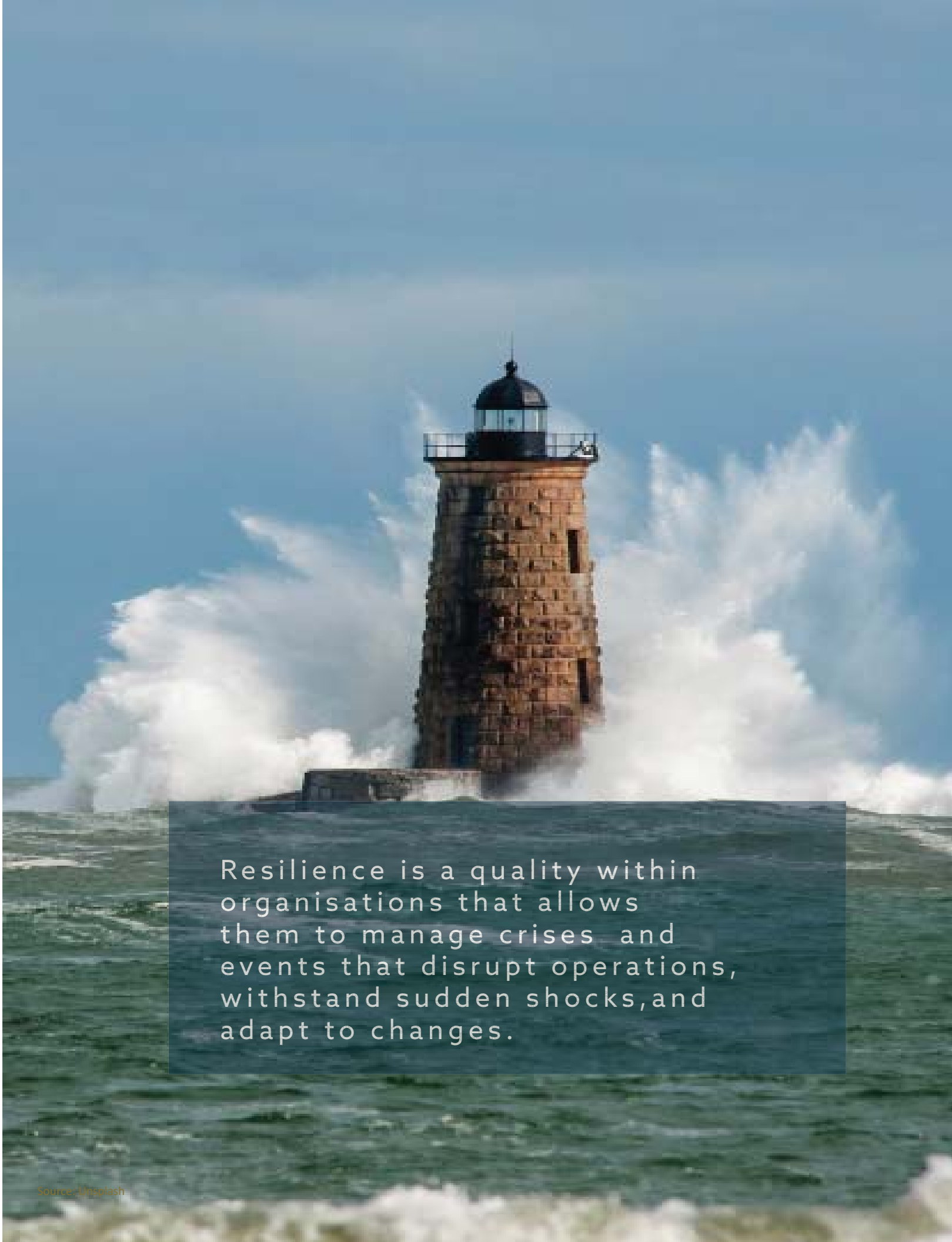


Resilience is a quality within organisations that allows them to manage crises and events that disrupt operations, withstand sudden shocks,and adapt to changes.

Source: Unsplash

INTRODUCTION

RESILIENCE: CONTINGENCY PLANNING, RESPONSE & DISASTER RECOVERY

McKinsey & Company conducted a study during the COVID-19 pandemic into the relationship between a company's organisational health and its financial performance. It showed that businesses exhibiting healthy, resilient behaviours were less likely than "unhealthy" organisations to go bankrupt over the ensuing two (2) years. Knowledge sharing, conduct of performance reviews, and bottom-up innovation were some of the "resilient behaviours" highlighted for success.

One noticeable observation made from the results of the McKinsety study, is that the resilient behaviours identified did not focus on the implementation of, or skills directly associated with, the expected business continuity and disaster recovery programmes. The resilient behavious were more closely linked to having a healthy people culture, and innovation. Resilience it was highlighted is not only about managing through adversity. Resilience allows people to summon the internal capacity to come through with a renewed sense of self-efficacy that actually motivates them to go even further. It allows organisations to come out of a defensive crouch and capitalize on new opportunities (Bruce, 2023)."

"Organisational resiliency", or "business resiliency includes the resiliency of the organisation's strategy, liquidity/cash, diversity/hedging, and operations" (Rasmussen,

Organisational resilience is "the ability of an organisation to absorb and adapt in a changing environment" (ISO 22316:2017 Organisational resilience – Principles and attributes). The British Guidance on organisational resilience standard defines resilience as: "the ability of an organisation to anticipate, prepare for, and respond and adapt to incremental change and sudden disruptions in order to survive and prosper". (BS 65000:2014)

2021). Within the operations of an organisation there are key enabling services such as information technology, the workforce, and its technical capacity and capabilities that are put to work by the leadership and management. The leadership therefore, plays an important role in developing, maintaining, and growing the resilience of an organisation.

BUILDING RESILIENCE

Resilience is the ability of a system or organisation to withstand and recover from adversity (Institute of Asset Management, 2020). "Repeatedly rebounding from disruption is tough, but some companies have a recipe for success; that is, a **SYSTEMS MINDSET** emphasising agility, psychological safety, adaptable leadership, and cohesive culture" (McKinsey & Company, 2022).

Fires, hurricanes, pandemics, equipment outages – these are the risk events often associated with contingency planning. But if a critical supplier or vendor suddenly goes bankrupt, or the entire air traffic management team comes down with food poisoning, or the JCAA website is held to ransom by hackers, these events can also wreak havoc on operations. The World Economic Forum's 2023 Global Risk Report indicates that the currently manifesting risks in the global environment include an energy supply crisis, cost-of-living crisis, rising inflation, food supply crisis, and cyberattacks on critical infrastructure. The Report also indicates that geopolitical tensions and a pessimistic global economic forecast are top of mind for leaders across the world. These are not only key issues in the global community, but for the air transport industry. Contingency planning and resilience analysis is the process and systems to ensure an organisation can continue to operate and deliver the required level of service in the event of an adverse impact, or to maintain the safety and integrity of its people and operations (whether or not its assets are operational).

In the face of this looming uncertainty, many leaders are thinking more about building resilience. Operational resilience, cyber resilience, supply chain resilience, and the resilience of the workforce all reinforce organisational resilience. Resilience in all areas of the organisation is important to mitigate against high-impact events that are often difficult to predict. Enterprise Risk Management (ERM) helps in the prioritisation of efforts and resources to build resilience organisation-wide.

Contingency Planning & Resilience Analysis covers the processes and systems put in place by an organisation to ensure that it is either able to maintain the services delivered by its assets despite serious events, incidents or disasters, or is able to recover these services within an acceptable period. The resilience of assets and asset systems for instance, is initially established during asset creation, through the use of systems engineering and reliability engineering. Contingency planning contemplates major crises and natural disasters, but can also prepare us for more mundane problems, such as the loss of team members, data, clients and customers,

Source: Unsplash

THE JCAA EXPERIENCE

The JCAA plays a critical role in nation building; toursim, international trade and e-commerce, are a few key areas. There is a vast array of international, regional and national industry and other stakeholders who rely on the services provided by the JCAA. Retreating in the face of challenges and disruptive events is not an option. The air navigation and regulatory oversight services and the enabling services which support them, as delivered by the JCAA, are, therefore, required to be delivered with the highest level of availability and safety.

The McKinsey study tells the story: display of healthy resilient behaviours is a key predictor of how successfully the JCAA will navigate through and emerge from a disruptive event.

We must continue to prepare our people, develop our processes and systems, create our assets with resilience in mind.

As the JCAA primes itself to meet the future, identifying the potential risks that may present, an understanding of the impact should they mainifest, is key to developing viable contingency and disaster recovery capabilities.

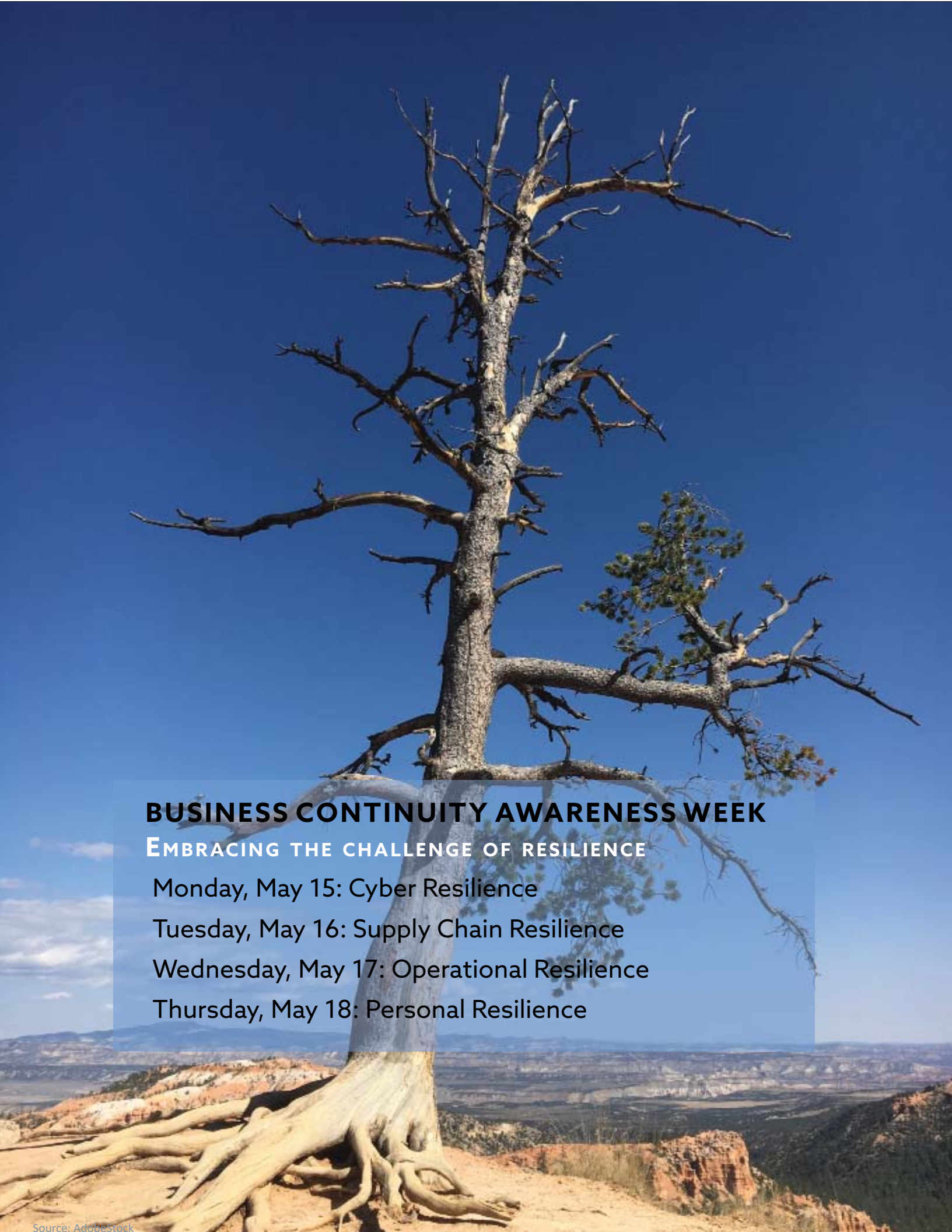
The Authority will continue to build the characteristics of a resilient organisation, anticipating challenges in the future, and preparing as best we can. Creating and putting in place a plan that can help us to respond to these challenges by taking action at the right moment and in the right way. When that plan is actually unfolding, we understand that it will not be static, but will evolve, as we adapt in response our response to change.

BUSINESS CONTINUITY AWARENESS WEEK (BCAW) (MAY 15-19, 2023)

An annual global event, led by The Business Continuity Institute (BCI) to raise awareness of the value of effective business continuity management. .

In 2023 BCAW will revolve around the theme **'Embracing the challenge of resilience'** (continuitycentral, 2023).

Source: Unsplash



BUSINESS CONTINUITY AWARENESS WEEK

Embracing the challenge of resilience

Monday, May 15: Cyber Resilience

Tuesday, May 16: Supply Chain Resilience

Wednesday, May 17: Operational Resilience

Thursday, May 18: Personal Resilience

Source: AdobeStock

8 Business Continuity and Operational Resilience Risks to Watch in 2023

1. Supply-chain challenges

In 2021, goods were stuck on cargo ships. In 2022, energy costs skyrocketed. The energy crisis that arose from Russia's invasion of Ukraine is a good reminder of the ongoing role fossil fuels play in the modern world. Cost and scarcity of energy continues to affect extended supply chains globally.

2. Financial constraints

Rising interest rates, shaky crypto, and a tight labour market have all contributed to today's uncertain economy. Companies that are not well capitalised could be in a precarious position if conditions worsen. Funding growth may be especially challenging.

3. Cyberattacks

Cyber threats are relentless with no signs of slowing. Phishing attacks, ransomware, and data breaches are all on the rise. Complicating matters, many of the activities are government sponsored, which makes them especially tricky to combat.

4. Environmental, social, and governance (ESG) demands

Employees, investors, customers, regulators, and other stakeholders are increasingly holding companies accountable for their environmental, social, and governance practices, like those relating to climate change and social equality. The European Union (EU) recently announced an agreement to impose a carbon-dioxide emissions tariff on carbon-intensive imports, which will impact manufacturers worldwide.

The Business Continuity Institute (BCI) was established in 1994.
The Institute's initial vision was to enable individual members to obtain guidance and support from fellow business continuity practitioners.

Source: Adobe Stock

8 Business Continuity and Operational Resilience Risks to Watch in 2023 (Cont'd)

5. Workforce challenges

Due to the "Great Resignation", quiet resignations, older worker retirements, and a constrained labour market, organisations are left with significant knowledge gaps and overstretched resources. Staffing issues limit an organisation's ability to react, which impacts the amount of room for maneuver in challenging circumstances.

6. Extreme weather events

Hurricanes, wildfires, tornadoes, and extreme temperatures are all happening with greater frequency, causing ever-greater damaging impacts. The resulting exposures are far reaching, spanning everything from property insurance to employee safety and supply-chain disruption.

7. Project risks

Managing risk is essential for the success of every project. Many project management teams are already stretched very thinly.

8. Regulatory uncertainty

Expanding regulatory activity continues. Several new laws are coming into play in 2023:

1. climate disclosures;
2. human rights protections;
3. ESG mandates; and
4. operational resilience requirements are all top on the agendas of regulators.

Large companies are usually the first to be impacted, but many mandates trickle down to smaller companies over time.

Source: AdobeStock

BUSINESS IMPACT ANALYSIS

A business impact analysis (**BIA**) is the process for analysing the consequences of a disruptive incident on the organisation. It identifies and assesses the effects that accidents, emergencies, disasters, and other unplanned, negative events could have on a business. The BIA predicts how a business will be affected by everything from a hurricane to a labour strike. International standards such as ISO 22301 (Security Resilience) and ISO 22313 (Business Continuity Management Systems) and ISO 22317 (Security and Resilience - Business Continuity Management Systems - Business Impact Analysis) guide the work in this area.

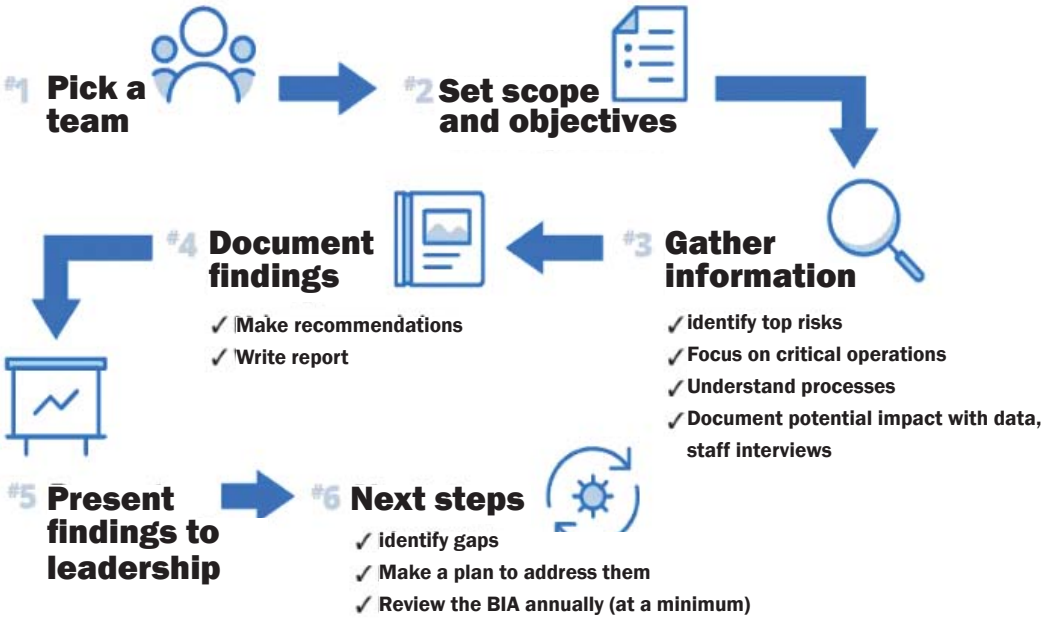
The objective of the BIA is to prioritise the various organisational components so that services can be resumed in a predetermined order following a disruptive incident to the satisfaction of stakeholders and interested parties. It identifies business functions, systems, manpower and technology resources which are required for operations to perform optimally.

Why Do Business Impact Analysis?

Business impact analysis enables a company to prepare, so it can respond rapidly and decisively to a crisis. BIA helps an organisation reduce the financial costs, downtime, harm to its reputation, and other damage from a disaster.

The outcome of business impact analysis is a report that often serves as the first step in business continuity planning (BCP), the process of figuring out how to keep operations running as much as possible in an emergency. In this way, BIA lays the groundwork for the development of measures to prevent or reduce the chances of a negative event happening.

Key Steps in Business Impact Analysis

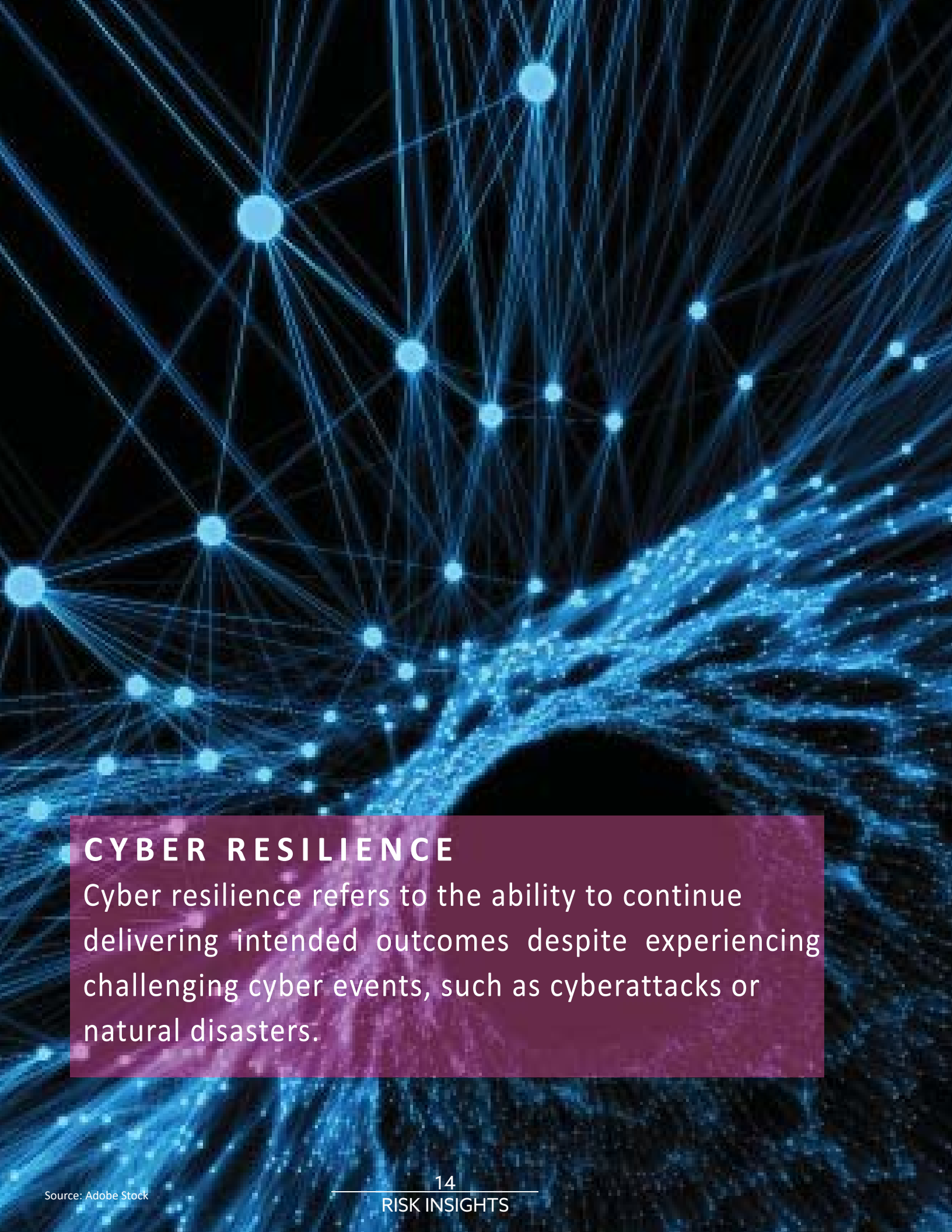


Source: SmartSheet

BUSINESS IMPACT ANALYSIS CATEGORIES

Financial Impacts	• Delayed sales or income • Contractual penalties • Regulatory fines • Increased expenses • Lost sales or income • Loss of market share
Infrastructure Impacts	• Delayed construction • Restricted access to facilities • Machinery/equipment damage • Building damage
Resource Impacts	• Absenteeism • Data loss/corruption • Supply chain interruption • Loss of power
Intangible Impacts	• Decreased customer satisfaction • Customer defection • Negative business reputation • Harm to brand • Diminished value of intellectual property • Loss of staff morale
Quality and Safety Impacts	• Ability to maintain product/service standards • Compromised worker safety • Environmental damage
Legal Impacts	• Failure to fulfill contracts • Breach of warranties • Force majeure • Failure to comply with regulations
Strategic Impacts	• Delay in new business initiatives • Decreased focus on new business opportunities • Reduced resources for innovation

Source: Smartsheet



CYBER RESILIENCE

Cyber resilience refers to the ability to continue delivering intended outcomes despite experiencing challenging cyber events, such as cyberattacks or natural disasters.

Source: Adobe Stock

SUPPLY CHAIN RESILIENCE

Supply chain resilience refers to a supply chain's ability to adapt to sudden change and unexpected risk.

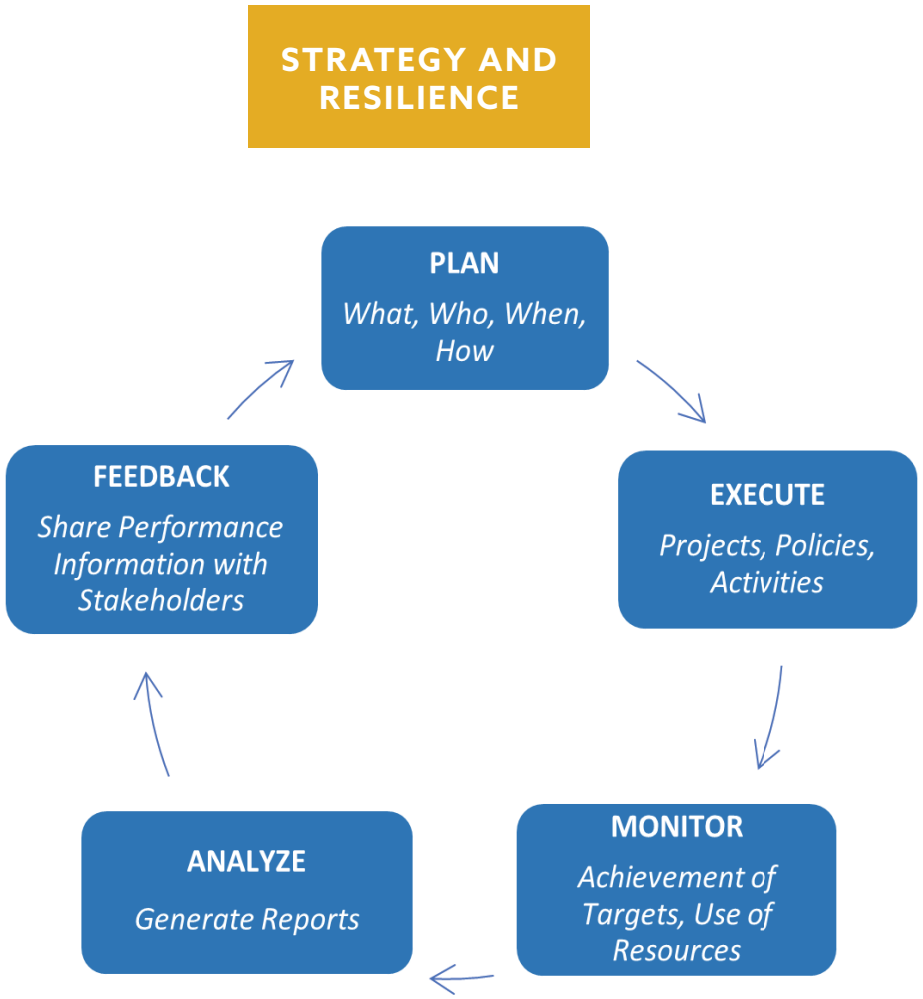
Source: Adobe Stock

Organisational Performance Management: *A means of building resilience*

Mrs. Denniesa Hinds Johnson
Corporate Planner
Jamaica Civil Aviation Authority (**JCAA**)

Have you ever wondered how organisational performance management can help an organisation to build resilience? You have, or maybe, the thought has never crossed your mind. In any case, the question is one that should be contemplated and discussed in organisations that intend to remain successful. The word 'resilience' often spoken of in the context of disasters, climate change, volatility and yes, ordinary business operations. Resilience can help with timely recovery of operations in instances of unexpected change. During times of unpredictability resilience can help an organisation to maintain a general sense of calm and reassurance when managing multiple changes simultaneously, but how does it impact on the way the organisation performs? That is, how does organisational performance management relate to the resilience of a business and its ability to manage disasters? Do you know? Let's take a look. Before we go further, it is important to understand what is referred to as organisational performance management. By performance management, we mean the year-round effort to set and accomplish a company's goals at both the organisational and individual levels (McKinsey and Company, 2021). Extended to the organisational perspective, performance management is a systematic approach to performance improvement through an ongoing process of: (1) establishing strategic performance objectives; (2) monitoring and measuring performance; (3) collecting, analyzing, reviewing and reporting performance data; and (4) using the data to drive performance improvement. **Figure 1** (overleaf) provides a summary of the performance management cycle.

Figure 1
Performance Management Cycle



At the organisational level, this means keeping score of the achievements of the organisation based on specific targets that are set in advance of a specified timeframe. In this article our focus will be on organisational performance. The environment in which an organisation exists is variable. Part of this dynamism forces organisations to deal with the ubiquitous reality of environmental shocks. External environmental shocks that affect an organisation may be related to changes in the economy, health-related issues (e.g., our recent grappling with the COVID-19 pandemic), political changes and events (e.g., the seemingly persistent Russia and Ukraine war), climate change related events (more intense and quicker-forming hurricanes, increased flooding, and drought conditions), technological changes (e.g., the growing use of artificial intelligence in organisations and life in general). The sudden and drastic changes that an organisation is exposed to, may also result in shocks within the organisation. These internal shocks may include breaches in governance procedures, impaired compliance, human capacity disruption and changes in fiscal resources which may result in strategic changes, policy changes, reorganisation to name a few. In most instances the nature of the external shocks will have an impact on the internal issues faced by organisations.

The best defence is a great offence!!

It is said that the best defence is a great offence. Awareness and preparation will help an organisation better respond to crisis. An organisation's offence in times of crisis then, depends greatly on the information that is available to guide strategic decision-making.

Our call to action:
Keep this in mind!!!

"It's not the strongest of species that survive, nor the most intelligent, but the ones most resilient and responsive to change."

Charles Darwin

STRATEGY AND RESILIENCE

Imagine if in the highest point of an economic crisis, the JCAA found itself with no available information on the organisation's historical financial performance. How then would we be able to determine the impact of the crisis on the organisation? What information would we use to determine how to reposition ourselves to maintain sustainability? An established organisational performance management system identifies and maintains performance data and information that can be ably relied upon for decision-making in times of crisis.

Peter Drucker, a famous management theorist posited that "what is measured, improves." The systematic measurement of organisational performance allows an organisation to detect changes and inform the need for recalibrating which may involve the revision or setting of new targets. It is important to note that the capricious nature of the environment in which an organisation operates regularly necessitates a change in strategy. A resilient organisation, therefore, must be agile and adaptable and armed with good performance information as a stoic organisation will get lost in the quagmire of change. Consistently keeping score enables an organisation to align its strategies, goals, and objectives so that areas that require improvement can be easily identified and best practices can be celebrated and sustained.

Accountability and clear assignment of responsibility are characteristics of an effective performance management system and are also features of the resilient organisation. When team members in an organisation are coalesced around a common set of goals and objectives, the organisation is readily able to establish priorities and determine where resources are to be directed; optimising efficiency even in times of crisis. When aligned with a well-defined business continuity plan, organisational performance management enables the mobilisation of efforts and resources in a more seamless way. That is, predictable responsibilities and targets are identified, and translated into verifiable actions that can help with keeping a general sense of calm and reassurance and restoration in times of crisis.

The JCAA is not insulated from the penetrable effects of the environment. It is inevitable that our organisation's existence is, from time to time, punctuated with shocks that may require strategic changes. Imagine if we had entered the period of the COVID-19 pandemic with little or no information on the Authority's performance in hand. For example, if we had no information on the number of air traffic movements we managed on a typical day? By what means would recovery be determined? How would we know if we had surpassed pre-COVID-19 levels in key areas of the operations, or if we were still lagging? How would we plan? It is in instances such as these that an organisation is able to use performance management information to respond to environmental shocks and build resilience going forward.

Our call to action is well-grounded in Charles Darwin's observation, **"it's not the strongest of species that survive, nor the most intelligent, but the ones most resilient and responsive to change."**

Resilience is not just about dealing with the issues and challenges of today. Rather, it is also creating a culture fortified with technology and digital tools that enable organisations to see around corners, to be ready for the changes that are yet to come. (McKinsey & Company)

Source: CCIS-JCAA

Succession planning and knowledge transfer are key aspects of organisational resilience

Business Continuity Central

Succession planning is the circle of life for an organisation; by enaabling the identification of identifying long-range human capital needs and cultivating a supply of internal talent to meet future needs. (Society of Human Resource Management). Succession planning thereby, helps entities to build resilience methodically. Through succession planning, formal transition plans for at-risk key roles and the successors to those roles are developed; improving organisational performance by reducing the impact of sudden departures (Continuity Central).

The majority of organisations lack a formal procedure for facilitating knowledge transfer between individuals, leaving them unprepared for the loss of employees in key roles. In an August 2021 survey of 580 members of the Society for Human Resource Management who were actively working as HR professionals, 56 per cent said that their organisation did not have a succession plan in place. Only 21 per cent reported having a formal plan, while 24 percent said their organisation had an informal plan. Companies in top-performing quartiles had succession plans 79% of the time (Strategy-business, 2015). 86% of leaders believe succession planning is an "urgent" and "important" priority, yet only 13% believe they do it well (Deloitte, 2014)

A company may suffer if employees leave critical positions; valuable knowledge, core business relationships, and profits may be lost. Planning and executing key role transitions can take years. The studies indicate that when workers leave and do not effectively transfer their knowledge, among other things the organisation may experience duplication of efforts (and resources) to solve problems.

Innovation enables businesses to remain competitive in today's market. New ideas are essential to solving difficult challenges. Innovation within an organisation may also be stifled by reduced capacity since tenured employees can determine the status quo faster to make way for novel thinking.

According to the Institute of Executive Development (IED) and Stanford University's Rock Center for Corporate Governance, few tactical shifts could help many organisations more fully leverage the value of succession planning, turning it into a value-add process, instead of a reactive one.

SUCCESSION PLANNING

Succession planning is the process of identifying the critical positions within your organisation and developing action plans for individuals to assume those positions. It is relevant to all companies, from the largest to the smallest, in both private and public sectors.

MITIGATION SUCCESSION PLANNING

Risks of Inadequate Succession Plannin g

Loss of mission -critical knowledge & experience from skilled/ specialised Team Members
(Systems, processes, protocols and customer relationships)

Negative emotional & cultural work environment
(Internal power struggles)

Choosing the wrong successor
(Hiring and promoting mistakes while trying to fill urgent gaps)

Losing internal talent
(Missing able and willing internal candidates who take talents elsewhere)

Poor leadership development

Factors to Consider for Effective Succession Planning

1. Leverage positions, not people
It is more effective and a best practice to determine which positions are best qualified to succeed another position rather than the individual people filling those positions at any given time.

2. Idenitify critical and vulnerable positions and be clear about the roles that will be included
Consider the impact each position has on the organisation's mission; if a vacancy in a position would impact the organisation's ability to accomplish their mission it can be classified as critical. Determine which critical positions have no identifiable successor. Critical positions can extend beyond senior leadership roles.

Considerations for succession planning (Cont'd):

3. Develop eligibility requirements

Transparency in the opportunity and candidate requirements fosters equity and trust in the selection process and aids employees in imagining possible career paths for their position.

4. Identify talent pipeline and nominate successors from the qualified positions

Consider inviting executives to suggest suitable team members for advancement in a succession plan, but also consider inviting team members to indicate their interest. . Determine a final list of candidates whose performance and job description makes them eligible for development into the successor role. Do not exclusively choose the employee closest in rank to the role that needs to be filled. Other promising employees should be chosen if their skills have the most potential.

5. Create an action plan to prepare successors

Creating a developmental plan for potential successors helps to identify meaningful opportunities for growth.

6. Evaluate the succession plan periodically

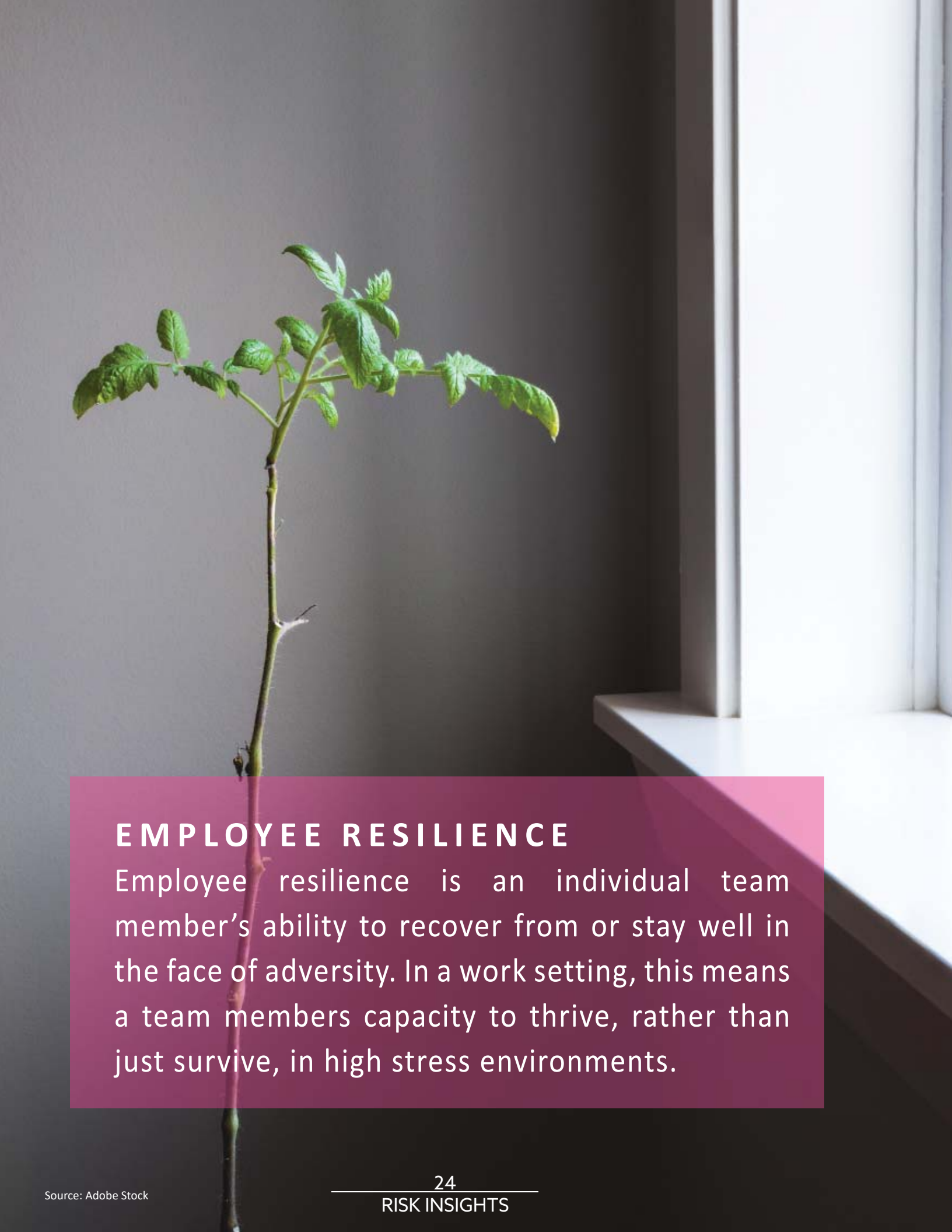
To ensure continual improve ment in the organisation's succession planning strategy, evaluate the succession planning efforts annually.

7. Recognise and reward leaders who develop others

Source: Adobe Stock

- Consider opportunities available through Leadership Development programs.
- Participation in the functional areas of the incumbent's role, especially areas outside of the incumbent's current experience.
- Mentorship from the incumbent.
- Provide coaching opportunities.
- Acting for the incumbent while they are away from work.
- Working on special projects or opportunities to stretch skills into aligned areas.
- Dual incumbency opportunities when the incumbent transitions out of their role.

Source: Business Continuity Institute, University of Washington



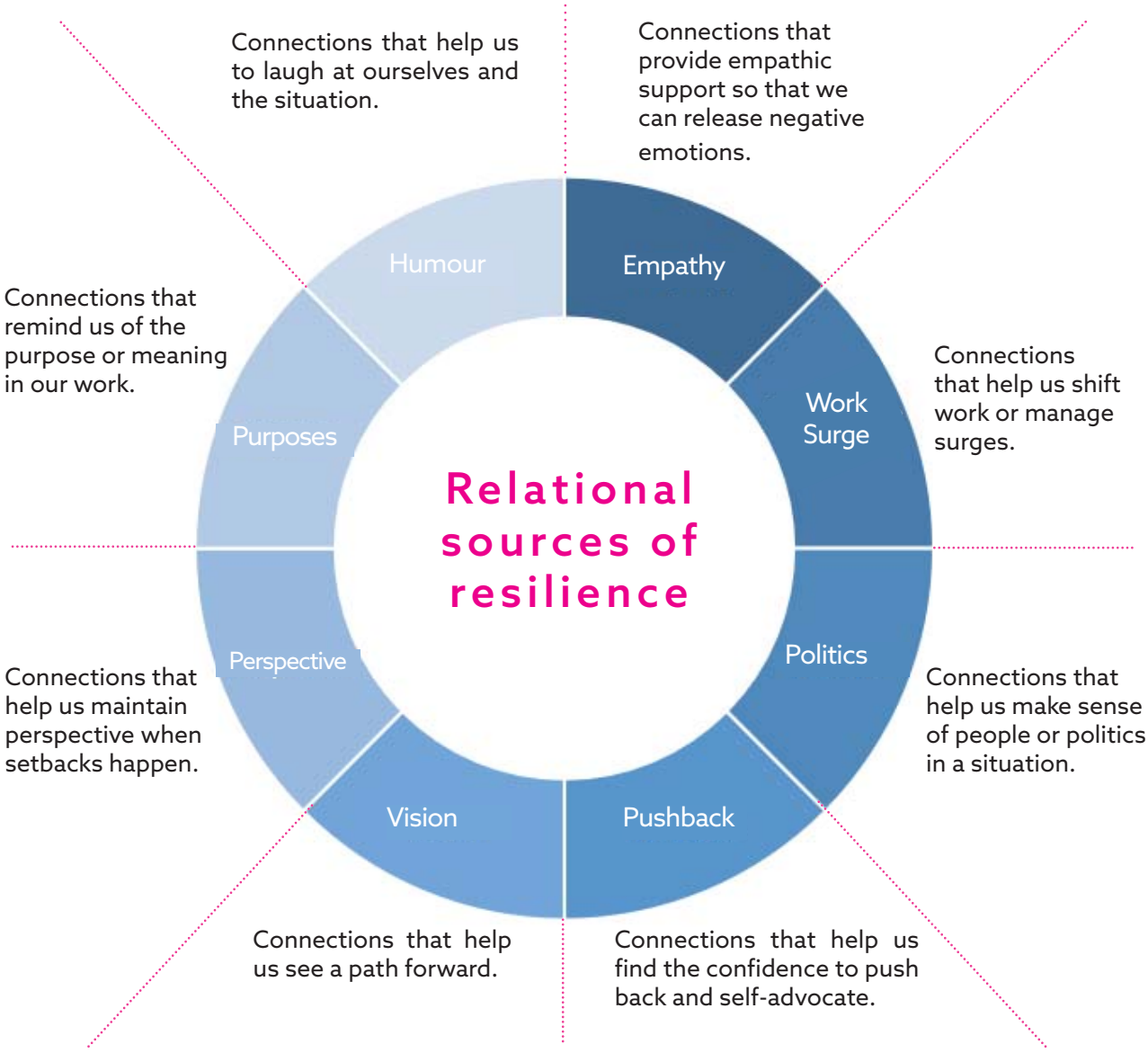
EMPLOYEE RESILIENCE

Employee resilience is an individual team member's ability to recover from or stay well in the face of adversity. In a work setting, this means a team members capacity to thrive, rather than just survive, in high stress environments.

Source: Adobe Stock

EMPLOYEE RESILIENCE

The distinction between successful and unsuccessful people is commonly cited as their capacity to recover from setbacks. It has been demonstrated that resilience can reduce depression levels and positively improve work engagement and satisfaction. Resilience, however, is more than simply an internal "grit" that enables us to recover. According to recent studies, resilience is also enabled by strong networks and relationships. Resilience then, can be strengthend through a range of encounters with individuals in our personal and professional lives.



Source: Harvard Business Review

Predicting low-frequency, high-impact events:

Machine learning and preventative maintenance

Business Continuity Central

"Extreme events in society and nature, such as pandemic spikes, rogue waves or structural failures, can have catastrophic consequences. Characterising extreme events is difficult, as they occur rarely, arise from seemingly benign conditions, and belong to complex and often unknown infinite-dimensional systems" (Pickering *et al.*, 2022).

There is an infinite set of physical conditions that can lead to a disastrous event. According to researchers, attempting to predict extreme events is comparable to trying to find a needle in a haystack. They explain that historically, finding extremes is often simplified by trying to reduce complex systems to their governing input variables and relevant output variables. With this approach importance sampling is used to quantify extremes. They point out that the technique uses a biasing distribution to identify areas of input space that have extreme values. The limitations identified in this technique are: (1) the technique often requires additional and challenging considerations to achieve accuracy, and (2) the technique may produce results that are static and which lack the agility to adjust to new information.

In the absence of large data sets, to overcome these challenges, researchers from Brown University and Massachusetts Institute of Technology (**MIT**) recommend using a sophisticated machine learning system in conjunction with sequential sampling approaches to predict the occurrence of extreme events.

In a study conducted, scientists combined statistical algorithms (that require less data to make accurate, efficient predictions) with a machine learning technique that was developed at Brown University. With the technique, machines were trained to predict scenarios, probabilities, and timelines of rare events despite not having a historical record of them. Because the events are rare, and there is not enough historical data, the focus was on the quality of the data and not the quantity (volume) of data available. The question that was contemplated in the study was: What are the best possible data that can be used to minimise the number of data points needed? **The sequential sampling method, ACTIVE LEARNING, helped the researchers to find the solution.**

ACTIVE LEARNING

Active Learning (**AL**) refers to the broad class of sequential sampling techniques for assembling efficient training datasets. It is a special case of machine learning in which a learning algorithm can interactively query a user to label new data points with the desired outputs. It is sometimes called optimal experimental design. These statistical algorithms analyse data that has been input to them, they learn the information and are able plot new data points.

Active Learning **(AL)** has been applied with neural networks in several fields, predominantly in classification tasks such as image recognition, text recognition, or object detection. Its application has not yet been widely used to predict rare events.

According to the researchers Deep Neural Operators (DNO), such as DeepONet, are built specifically for handling infinite-dimensional systems and provide the ideal surrogate model for characterising extremes. DNOs directly map physical, infinite-dimensional functions to physical, infinite-dimensional functions. This leads to drastic improvements in generalisation to unseen data in high dimensions. It must be noted that identifying and appropriately defining theacquisitionfunctionsforuncovering extreme behaviour are just as critical as the chosen surrogate model.

The study combined extreme acquisition functions with several DNOs. They were used to test three classes of high-dimensional systems:

- Rogue waves;
- Dangerous pandemic scenarios (spikes); and
- Estimate structural stresses to a ship.

OUTCOME

As with neural networks the limitation of the DeepONet tool is that it requires large amounts of data to make projections. The research team showed that combined with active learning techniques, the DeepOnet model can get trained on what parameters or precursors to look for that lead up to the disastrous event someone is analysing, even when there are not many data points.

They appllied the approach to pinpointing parameters and different ranges of probabilities for dangerous spikes during a pandemic, and was able to find and predict rogue waves, and estimated when a ship will crack in half due to stress. For example, formation of rogue waves that are more than twice the size of surrounding waves — the researchers found they could discover and quantify when rogue waves will form by looking at probable wave conditions that nonlinearly interact over time, leading to waves sometimes three times their original size.

FUTURE FOR CONTINGENCY PLANNING

The research team provided guidelines and recomendations for future experiment design that will minimise costs and increase forecasting accuracy. Karniadakis, a member of the research team is already working with environmental scientists to use the method to forecast climate events, such as hurricanes.

"Discovering and forecasting extreme events via active learning in neural operators" is based on research conducted by Ethan Pickering and Themistoklis Sapsis from MIT, and George Em Karniadakis from Brown University.

FAA system outage causes nationwide flight disruptions.

January 11, 2023 7:15 a.m. EST:
The FAA has ordered airlines to pause all domestic departures until 9 a.m. Eastern Time to allow the agency to validate the integrity of flight and safety information.

January 11, 2023 8:50 a.m. EST:
Normal air traffic operations are resuming gradually across the United States following an overnight outage to the FAA's Notice to Air Missions (NOTAM) system that provides safety information to flight crews. The ground stop has been lifted.
The agency continues to look into the cause of the initial problem.

January 11, 2023 6:30 p.m. EST:
The FAA is continuing a thorough review to determine the root cause of the Notice to Air Missions (NOTAM) system outage. Our preliminary work has traced the outage to a damaged database file. At this time, there is no evidence of a cyber attack.

January 19, 2023 7:15 p.m. EST:
A preliminary FAA review of last week's outage of the Notice to Air Missions (NOTAM) system determined that contract personnel unintentionally deleted files while working to correct synchronization between the live primary database and a backup database.
The FAA made the necessary repairs to the system and has taken steps to make the NOTAM system more resilient.

In the early morning of January 11, 2023, the Federal Aviation Administration's (FAA's) Notice to Air Missions (NOTAM) system failed. A nationwide Ground Stop (GS) was declared later that morning across the United States following the failure of the NOTAM system.

The FAA's outage, was the second significant air transport interruption in less than a month. It is the first national grounding of flights in about two decades (since 9-11 in 2001). More than 10,000 flights were delayed and over 1,300 canceled (FlightAware.com).

Source: Adobe Stock

Aviation Safety

One of the key elements to maintaining the vitality of civil aviation is to ensure safe, secure, efficient and environmentally sustainable operations at the global, regional and national levels (ICAO)Aviation safety refers to the efforts that are taken to ensure that the aviation system is free from factors that may lead to injury or loss. Safety is the highest priority for all involved in aviation. It is a core value-offering of rapid and dependable air services, and international cooperation on aviation safety by governments and industry groups, through ICAO, has helped to make commercial aircraft the safest way to travel (ICAO). Improving the safety of the global air transport system is ICAO's guiding and most fundamental strategic objective. The Organisation works constantly to address and enhance global aviation safety through coordinated activities and targets outlined in its Global Aviation Safety Plan (GASP). The purpose of the GASP is to continually reduce fatalities, and the risk of fatalities, by guiding the development of a harmonised aviation safety strategy. The number of fatal accidents represented as Fig 1. The shared goal is for every flight to take-off and land safely, as happens more than 126,000 times every day (IATA).

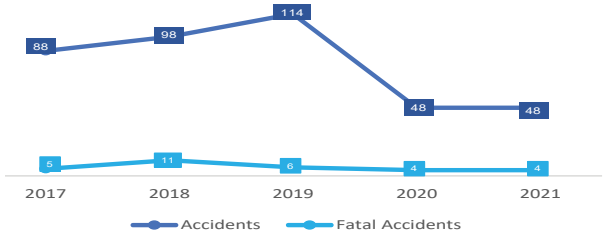


Fig. 1: Count of worldwide accidents and fatal accidents on scheduled commercial flights (2017-2021).
Source: ICAO

Notices to Airmen (NOTAMS)

Notices to Airmen (NOTAMS) is a "notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations", (ICAO Annex 15).

The NOTAM System disseminates these notices or messages. They appear under ICAO Annex 15, Aeronautical Information Services, and convey critical flight safety information to pilots and aircraft dispatchers. In addition to information about the current conditions and hazards associated with airports, airspace, navigational aids, and air traffic services, NOTAMs also include safety-critical details, such as possible airport construction activity, and associated hazards, such as temporary cranes or other aerial obstructions, possible runway closures, and outages of facilities and equipment used for in-flight navigation, communications, and aircraft tracking.

The FAA's NOTAM system conveys information about temporary flight restrictions, including airspace restrictions imposed for national security reasons. This information is gathered from a range of sources, including FAA's flight data center, airports and other aviation facilities throughout the country.

Safety is the highest priority for all involved in aviation.

Source: Unsplash

Impact of the System Outage

ICAO Annex 15 calls for NOTAMS to be timely. NOTAMS are time-sensitive because of the ongoing changes within the aviation system that impact operations. NOTAMs are part of a pilot's "Flight Bag," a set of documents reviewed by pilots before their aircraft sets off on its planned route. Pilots rely heavily on this information for flight planning and they cannot conduct flight planning, make safe, informed decisions, or guarantee safe results without access to NOTAMS. The FAA's NOTAM system prevented airports from filing updated safety notices. After being down for several hours, NOTAMS were no longer current and therefore presented a safety hazard to air traffic operations.

Safety and Mission Critical Systems

Safety Critical System: Any failure in these systems results in injury, death or damage to the environment. For example, chemical plant system.

Mission Critical Systems: Any failure in these systems result in the failure of some expected goals. For example, Spacecraft navigation system. A mission-critical system is essential to the survival of a business. When a mission-critical system fails or is interrupted, business operations are significantly impacted.

Building Resilience: Contingency Planning

The FAA NOTAM system has a primary and a backup database. The databases are designed to be synchronised. Synchronisation helps to ensure that if the primary system fails the back up system provides up to date information when activated.

Response: Ground Stop

Mitigate the risk and investigate the root cause.

A Ground Stop (GS) is a traffic management initiative (TMI) requiring aircraft that meet specific criteria to remain on the ground at their origination airport. The GS may be airport specific, related to a geographical area, or equipment related. Ground stops are implemented when air traffic control is unable to safely accommodate additional aircraft in the system. A ground stop does not affect flights en route; however, it is often followed by orders to divert to other cities.

Ground stops are considered to be the most restrictive of the TMIs. Airlines are required to manage their aircraft at all airports to minimise the impact to passengers affected by the ground stop. Ground stops can result in flight cancellations and lengthy delays, costing the airlines as they attempt to mitigate the impact to passengers.

Recovery::
Restore Services

The Ground Stop (GS) was lifted after the root cause was identified. A file was accidentally deleted during a maintenance activity to improve the synchronisation between the primary and secondary NOTAM databases.

Source: Adobe Stock

The Story Reported in the Media (Extracts)

"Thousands of flights across the U.S. were delayed Wednesday January 11, 2023, after a Federal Aviation Administration pilot alert system failed overnight, prompting a nationwide halt to departures.

The FAA lifted the Ground Stop on departing flights around 9 a.m. ET as it worked to restore the Notice to Air Missions system, which is responsible for sending messages pilots, such as those about closed runways, hazards and other information.

The FAA's outage was the second major air travel disruption in less than a month and drew bipartisan criticism. Winter storms derailed holiday travel in late December, 2022, prompting widespread cancellations and a crisis at Southwest Airlines after it buckled from all the schedule changes.

The NOTAM system failed at 3:28 p.m. on Tuesday, according to an FAA notice. The issue resulted from a corrupted system file, according to people familiar with the matter. The FAA thought the problem was resolved but it wasn't, the people said, so the agency later decided to reboot the system altogether and on Wednesday morning ordered a ground stop, which holds planes scheduled to depart. The NOTAM system does have a backup, but both the primary and backup systems had been fed by the bad data, according to a person familiar with the matter". (CNBC)

Source: Unsplash

Disaster Recovery: The process by which a company prepares for and responds to technological disasters. IT systems could abruptly fail because of unforeseeable catastrophes like power outages, calamities, or security problems.

Source: Unsplash

DID YOU KNOW?

The average time it takes threat actors to move laterally from a compromised host dropped 14% between 2021 and 2022; the incident response team must act sooner to stem the loss or threat.

According to the 2019 Global Data Risk Report by Varonis, 22% of a company's network folders are not protected. The bigger the company, the more files that can potentially be compromised.

Aviation is the safest form of long distance transport. In 2018, the all accident rate (measured in accidents per 1 million flights) was 1.35, which was the equivalent of one accident for every 740,000 flights.

"An hour of downtime costs £6,038 for a small company, £55,851 for a medium company and £528,325 for a large enterprise." For large enterprises, this equates to approximately £8,755 per minute. (Datto)

75% of small businesses do NOT have a disaster plan in place. 90% of smaller companies fail within a year unless they can resume operations within 5 days after a disaster.

75% of companies suffered supply chain disruption in the early days of the pandemic. (March 2020 survey). 90% of business across industries anticipate long-term impact to their business.

96% of companies with a trusted back-up and disaster recovery plan were able to survive ransomware attacks.

Ransomware attacks cause 16.2 days of downtime. Data backup remains the single greatest protection against ransomware, as it allows businesses to quickly recover

GLOBAL CYBERATTACKS INCREASED 38% IN 2022

Globally, in 2022, the education and research sector was the most attacked industry, with an average of 2,314 attacks per organisation every week (a 43% increase over the previous year). (Checkpoint, 2023)

Source: Unsplash

PUZZLE CHALLENGE

JUMBLE

Unscramble the words below. One letter to each square to form five words

RAILEIN						
○				○		

PTRSDUI						
	○	○				

MACBREE						
○				○		

VEROCER						
		○	○			○

HDUSERC						
			○	○		○

A SCRAMBLED WORD GAME

Now arrange the circled letters to form the answer. The cartoon above is your clue.

YOUR ANSWER WILL FIT IN THE CIRCLES BELOW

DECEMBER'S SOLUTION | After an exhausting day of frightening people, the legendary horseman was A " SLEEPY HEAD"

Source: VectorStock

For inquiries contact

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Source: Adobe