THE RESILIENCE SHIFT

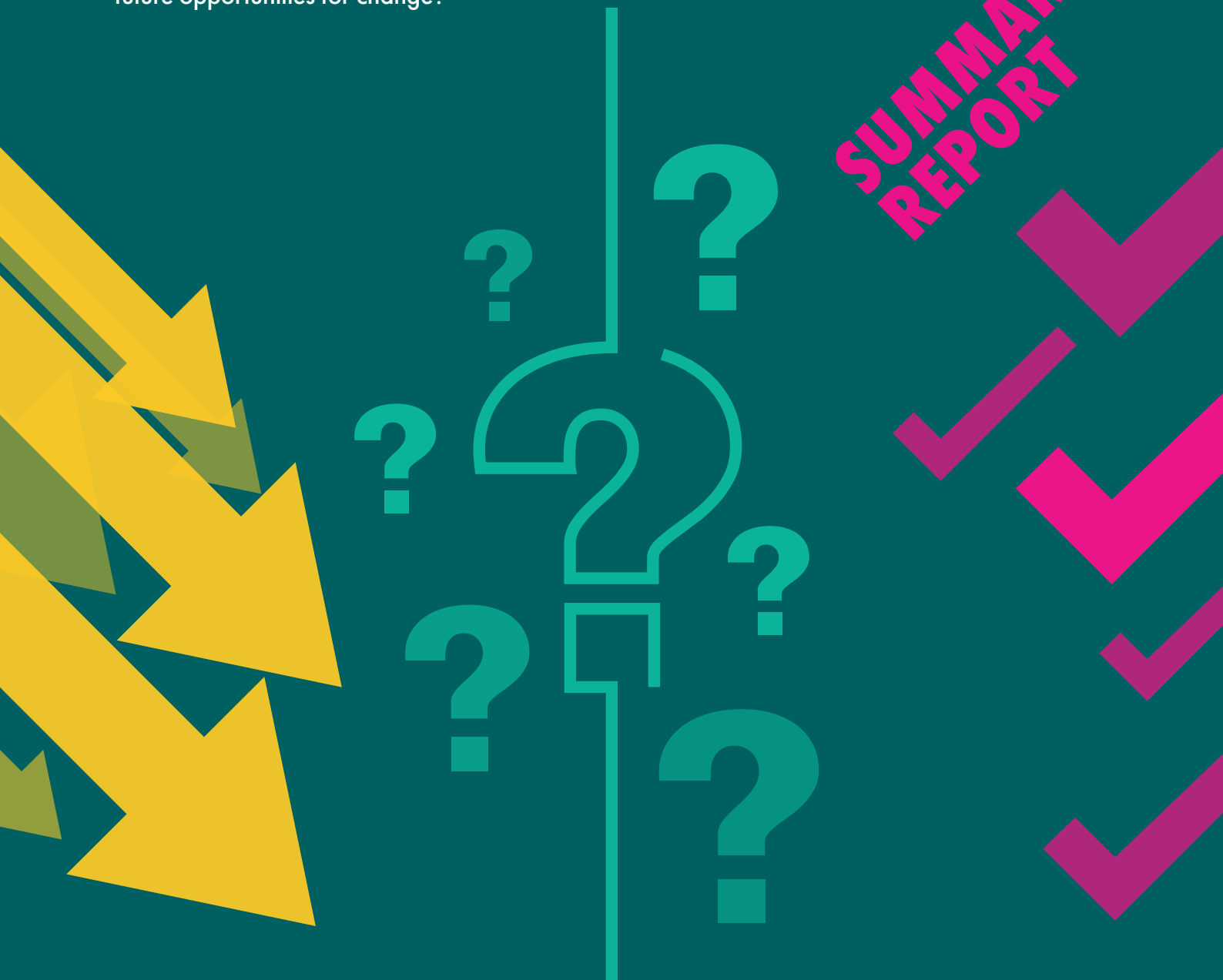
Lloyd's Register Foundation

ENGINEERING A SAFER FUTURE

LEARNING FROM CRISIS: FROM DISRUPTION TO TRANSFORMATION

Summary report: What has the Covid-19 pandemic taught us about future opportunities for change?

SUMMARY REPORT



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CONTENTS

ENGINEERING A SAFER FUTURE
LEARNING FROM CRISIS: FROM DISRUPTION TO TRANSFORMATION

This report, *What has the Covid-19 pandemic taught us about future opportunities for change?*, is the summary report of a series of related reports and podcasts available at www.lrfoundation.org.uk/en/learning-from-crisis

Summary report

Data

Safety at work

Education

Infrastructure

Public understanding of risk

ABOUT THE SERIES: LEARNING FROM CRISIS

Resilience is the ability to withstand, adapt to changing conditions, and recover positively from shocks and stresses.

The Resilience Shift is committed to understanding how crisis can reveal both the weaknesses and strengths of the systems on which we rely, and to sharing stories and insights across a variety of sectors towards building long-term resilience.

We have investigated the experience of recent crises, bringing together diverse experiences and perspectives across stakeholders to bear witness to the impacts of deeply disruptive events, and the individuals, decisions, technologies and processes that shaped the response and recovery.

Learning from Day Zero[1] is a series of film-based learning modules capturing reflections from key individuals involved in the response to the 2017-18 water crisis in Cape Town, South Africa. Developed in partnership with the Cape Town Drought Response Learning Initiative, these modules feature insights curated from over 50 hours of in-depth, filmed conversations with government officials, civil society activists, academics, and business and community leaders.

The *Resilient Leadership*[2] project is a real-time reflective learning document that captures reflections from city government and corporate leaders navigating their organisations' responses to the Covid-19 pandemic. Through insights distilled from weekly conversations over a 4-month period, the project reveals key attributes of leadership during a crisis and identifies three questions to shape the future of resilient leadership.

Engineering a Safer Future[3] – insights from which appear in this publication – seeks to explore the impact of disruption and its ability to create a window of opportunity for transformative change. The insights emerged from in-depth expert conversations with senior leaders about the ramifications of the Covid-19 crisis in more detail within specific sectors.

Collectively, these investigations not only strengthen our broad understanding of resilience in practice, but also help us to shape and influence future work. They also actively explore different and innovative approaches to capturing and sharing learning.

1 https://www.resilienceshift.org/cape-town-learning-from-day-zero/
2 https://www.resilienceshift.org/resilient-leadership/
3 www.lrfoundation.org.uk/en/learning-from-crisis

ENGINEERING A SAFER FUTURE

At The Resilience Shift, we have long recognised that the past is an increasingly unreliable predictor of the future, and that deep uncertainty around challenge and risk is felt across many sectors. In 2020, the rapid global impacts of Covid-19, and its consequences across every aspect of the work that Lloyd's Register Foundation supports, provided a unique opportunity for us all to consider the transformations we'd like to see as we emerge from this crisis.

Together, Lloyd's Register Foundation and The Resilience Shift have developed this series of conversations as an antidote to the pervasive online 'noise' that confronts us as we seek serious discussion and meaningful insight into the ramifications of this crisis. We sought to bring together innovators working within the Lloyd's Register Foundation's grant programme, joined by outside subject matter specialists, with the aim of surfacing insights on the likely scale and permanence of changes that Covid-19 has triggered. Our participants also examined how we approach infrastructure systems and interdependencies, and what the pandemic can tell us about our existing preparedness and horizon-scanning practices.

With the five sessions respectively focused on safety at work, data and information systems, education, infrastructure and public understanding of risk, this series explores both the impact of disruption and how disruption can create windows of opportunity for change

APPROACH AND FORMAT

The closed-door, intimate roundtable format was designed to facilitate fluid interaction amongst a small group of partners, associates, subject matter experts and grantees of the Lloyd's Register Foundation and of The Resilience Shift. Participants were given latitude to steer the conversation towards their specific sector or area of concern, their experience of challenges, and their thoughts on plausible ways forward.

PARTICIPANTS

ABOUT THE MODERATORS

Dr. Juliet Mian | The Resilience Shift* Deputy Director

An experienced Civil Engineer of over 20 years' experience working on infrastructure projects both in the UK and overseas, Juliet is a systems thinker who cares deeply about delivering engineering solutions to meet the challenges our planet faces.

Dr. Jan Przydatek | Lloyd's Register Foundation Director of Technologies

Jan is currently Director of Technologies at Lloyd's Register Foundation whose portfolio includes the Foundation's grants to the Structural Integrity Research Foundation and ICON.

Chris White | Lloyd's Register Foundation Senior Programme Manager

Chris is a programme manager with expertise in whole life cycle of natural and mathematical sciences, complexity science and risk, uncertainty and industrial engagement.

Dr. Tim Slingsby | Lloyd's Register Foundation Director of Skills & Education

Tim is the Director of Skills & Education at Lloyd's Register Foundation.

ABOUT THE PARTICIPANTS

Alan Turing Institute*
American Society of Civil Engineers
Blockchain Labs for Open Collaboration*
Coalition for Urban Transitions
eThekwini Municipality, Durban
Gallup*
Imperial College
Lloyd's Register Foundation
Lloyd's Register Group
National Safety Council
National University of Singapore*
Open Data Institute*
Royal Academy of Engineering*
Royal College of Art*
Sense about Science*
TWI*
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* Lloyd's Register Foundation grant recipient

LESSONS LEARNED

The Covid-19 pandemic, uniquely amongst recent disruptive events, has at the same moment provided everyone on the planet with the same frame of reference. We have all had our lives and livelihood affected in some way by this crisis, and we have all been given a wake-up call as regards the importance of resilience.

We all have seen systems falter in the face of the pandemic, and we have all seen innovation and adaptability succeed in our response. We have certainly all been provided with a trigger for reflection on how well we reacted to this global crisis, and how we can better prepare for the next one.

That there is another global crisis coming is in little doubt; in a sense, the Covid-19 experience has been a small scale model for the sort of multilateral disruption that climate change will inflict, sooner than any of us would like.

During these five conversations, over 20 participants representing a range of specialisms and geographies all converged on several points of unanimous agreement:

Our century-plus of increasing specialisation has made astonishing progress possible across a vast array of disciplines; at the same time the resultant siloisation has left us dangerously unable to coordinate, cooperate and work to mutual benefit in moments of urgent need.

Our technological abilities have been extraordinarily helpful in adapting to the shifts in working and living patterns resulting from the pandemic, and are not to be taken for granted; had the disease struck even a decade ago our ability to respond with such technological agility would have been nearly non-existent. At the same time, our reliance on technology risks becoming a vulnerability of its own.

If the next virus we encounter is digital rather than biological, the consequences to our way of life and economic systems could be an order of magnitude more severe.

Our ability to communicate clearly and effectively about risk of all kinds – present risks, future risks, the likelihood of impacts from given risks – has not kept pace with either the array of risks we face or the number and dynamism of channels by which we receive information. Every single industry, organisation and government would benefit from closely reviewing how public communications were handled during the Covid-19 crisis, and how they can be made more effective.

Above all, our participants agreed on the critical role of human connection – in breaking out of our disciplinary silos, in effectively implementing remote education, in agreeing on data privacy and regulation, and in navigating our relationship with technology – as a keystone for resilience.

"It's going to require leadership at all levels to tackle this convergence of crises that we face globally."

"What we now give seminars about as 'holistic thinking' used to be called common sense."

WHAT DOES THIS TELL US ABOUT RESILIENCE?

EMERGING INSIGHT 1

Innovation and adaptation can be relied upon in a crisis

Across all five sectors, our participants lauded the resilience of human efforts to solve problems and find solutions in the face of the Covid-19 pandemic even when systems, procedures, infrastructure or technologies were critically stressed.

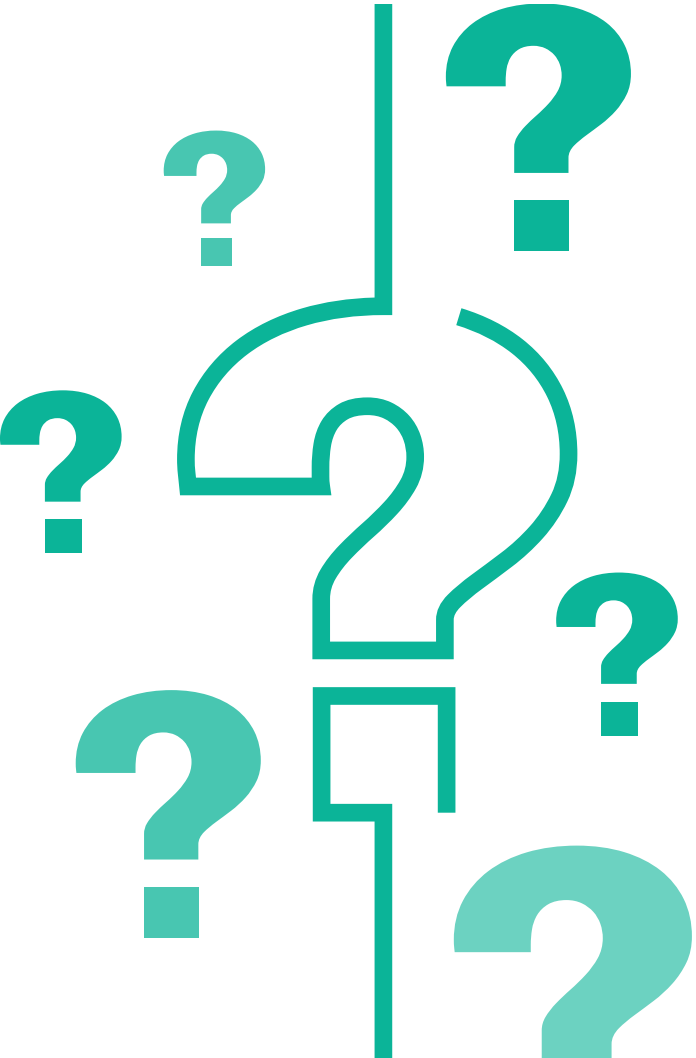
The Covid crisis has demonstrated that globally, innovative responses to crisis and adaptability to rapidly shifting economic, social and technological environments are not in short supply, and this is cause for reassurance as we confront a world of ever-increasing volatility and uncertainty.

EMERGING INSIGHT 2

The Covid-19 pandemic was a scale model for future disruptions

The single most widely recognised theme across all five of our conversations was that the Covid-19 pandemic, in terms of its simultaneous global impact, is a model for the sorts of multisector, long-tail disruptions we can expect to result from climate change.

The human and economic cost of the pandemic has been significant, and the disruption far-reaching, but in general the speed, flexibility and innovation of our global response has given us both cause for optimism and a sense of renewed urgency to fight against complacency.



EMERGING INSIGHT 3

The post-crisis inflection point requires conscious choices

We have a brief window of time in which to make decisions about the working patterns, technological platforms, educational approaches, and resilience measures we will implement as we move forward from the immediate shock of the Covid-19 pandemic.

From the individual level up through communities, organisations, governments and sectors, we should make considered, conscious choices about the new habits, patterns, technologies, regulations and resilience strategies we adopt. While expedient solutions to both technological and rights issues may be appealing as a path 'back to normality', we must be wary of both 'crisis offerings' of rapidly packaged off-the-shelf or turnkey solutions and 'crisis politics' which allows governments leeway to restrict or remove data privacy rights and steer regulation around data science in the name of expediency.

EMERGING INSIGHT 4

We need to understand whole systems, and how those systems relate to one another

'Systems thinking' has long been a watchword in resilience circles; the Covid-19 pandemic has provided a global case study in the importance of understanding whole systems rather than their constituent parts, and how those systems interrelate.

We live in an interlinked world, where complex systems may be economically or even physically connected but managed, maintained and overseen by discrete entities. Recognising this means encouraging multidisciplinary conversations and supporting both systems thinking and management of intersystem relationships by engaging across the value chain, identifying points of integration and transference ability, and managing uncertainty are key to building a resilient future.

HOW DO WE GUIDE A MORE SUSTAINABLE FUTURE?

KEY TAKEAWAY 1

Our reliance on technology is its own vulnerability

Technology has in many ways proved a saviour in the face of the disruptions to working and living patterns resulting from the pandemic, but our rapid shift to remote working, purely digital communications, and heavy reliance on digitally mediated logistics has left us even more vulnerable to disruptions of our technological systems than we were before the Covid crisis. Data is a critical resource, and too often our resilience planning and redundancy expectations don't acknowledge this.

Especially given the magnitude of our post-pandemic technological shifts, should the next virus be digital rather than biological, the human and economic impact could be a magnitude of order greater than that caused by the pandemic. This acute vulnerability to digital systems failing exists alongside a secondary, more pernicious hazard, namely the divide in digital equality, both exacerbated and accelerated by the experience of Covid-19, which threatens to minimise the voice, contributions and participation ability of digital 'have nots', particularly in the global south.

KEY TAKEAWAY 2

To best support human needs and mental health, tech solutions must put *effectiveness* ahead of *efficiency*

The impact of the Covid-19 crisis on general mental health and wellbeing will be severe and long-lasting. The pandemic and our responses have presented a 'perfect storm' of stressors: in addition to the personal issues of childcare, relationships and worry about the impact of the virus on family and friends, a significant percentage the global population is coping with the overwhelming information flow about the crisis while simultaneously experiencing a severe reduction in human social contact due to lockdowns.

While in many sectors the fluidity of the shift to remote work has been impressive, analog business practices such as meetings and offhand conversations don't always map reliably onto digital platforms. Too often the transition to remote working means losing the 'human glue' of daily interactions in favour of highly transactional exchanges. In the long term, this means carefully assessing the utility of returning to pre-Covid work practices out of familiarity or habit, while ensuring that the technological substitutions we make for in-person exchanges are designed to be *effective*, not just *efficient*, and provide features to enable the informal, personal and serendipitous interactions key to human relationships.

KEY TAKEAWAY 3

Our inability to model specific consequences of the pandemic highlights the need for general resilience and organisational agility

For years before the Covid-19 crisis, 'global pandemic' had been correctly identified in futures research across many sectors as a likely risk. Few planning models, however, identified the specific consequences of the pandemic as they unfolded: widespread lockdowns, the physical, mental and political fallout of quarantine restrictions, and the sudden exacerbation of technological and labour inequalities.

Historically, our willingness to imagine consequences of disruption has suffered from optimism bias; at the same time, our willingness to invest in preparedness for 'outlier scenarios' – things that can come as a complete surprise because they lie way beyond usual observations – has historically not been in proportion to their consequence. Covid-19 stands as an object lesson in our need to both better address low-probability, high-consequence events in planning, and better balance this requirement against the need for ongoing responsiveness to more frequent stresses.

KEY TAKEAWAY 4

We need to be sure we're measuring the things that matter

Data is critical to understanding trends in every single sector and at every scale, but in order for that data to be truly meaningful, we must ensure that we're measuring the things that matter. In the case of Covid-19, an agile reporting focus has been critical to ensure that our data streams are reliable, whether counting mask distribution, ventilator production, infection rates or contact tracing.

A system that measures local optimisation of one dataset (for example the immediate economic benefits of commuter air travel) can obscure the reality of global effects in related datasets (for example the long-term global climate consequences of aviation-related emissions). Rigorously interrogating the narratives our data supports is critically important to shifting how we understand and value our world.

NEXT STEPS

Our discussions have highlighted a number of challenges emerging from the pandemic that span our the five various sectors of safety at work, data and information systems, education, infrastructure, and public understanding of risk. Some of these are longstanding issues – such as balancing the need for rapid response with our human difficulties in considering and communicating risk and the additional mental burden created by traumatic disruption, to leveraging accessible solutions while ensuring obstacles posed by privilege and inequality do not become embedded, and empowering diverse and agile approaches while responding with one voice in times of need.

Others are new concerns, or are revealed as particularly significant by the Covid pandemic, such as how we handle, regulate, and rely upon data during a worldwide disruption, a growing need to ensure that our technological answers are matched to questions of human need, and how a global shock reveals the underlying stresses that pressure our daily lives – especially for the most vulnerable people.

Overall, however, our response to the pandemic has proved that no matter the sector involved, dedication, innovation and adaptability are there to be called upon in the face of global disruption. As we move further into a century likely to be defined both by increasing systems integration and complexity, as well as by these sorts of large-scale shocks, the Covid crisis has shined a light on the sort of transformational change we need to see to build true resilience into all of our endeavours.

The insights raised during these conversations by leaders from around the world clearly say that we know what needs to be done, and that we are capable of the doing.

Let's get to work.

ABOUT LLOYD'S REGISTER FOUNDATION

The Lloyd's Register Foundation seeks to secure for the benefit of the community high technical standards of design, manufacture, construction, maintenance, operation and performance for the purpose of enhancing the safety of life and property at sea, on land and in the air.

The *Engineering a Safer Future* programme is designed to focus on sharing existing experience and knowledge within and between sectors, and forms an important part of the delivery of our strategic theme accelerating the application of research.

The Lloyd's Register Foundation's programme supports resilience, by addressing:

- Governance: incentives, standards, rules, legal and financial
- Capacity building and engagement: professional development, publications, communication and public engagement
- Data and supporting tools: shared datasets, modelling and simulation, decision support
- International and global scale networks: studies of global systems, supply chains, knowledge networks.

ABOUT THE RESILIENCE SHIFT

The Resilience Shift is a catalyst for positive change. We seek to inspire and empower a global community to make the world safer through resilient infrastructure. Our mission is to help ensure the safety and continuity of the critical infrastructure and services that make our lives possible. From water and transportation to communications and energy, resilience is essential to everything we do. We're working globally to help define resilience and provide pathways from theory to practice.

Supported by Lloyd's Register Foundation and Arup, The Resilience Shift provides knowledge and tools to those responsible for planning, financing, designing, delivering, operating and maintaining critical infrastructure systems. We are not just a think tank, not just a grant-making body, and not just a convening network. Our impact is achieved through a proactive approach combining all three of these roles.

The Resilience Shift's approach is through learning by doing in collaboration with others, as well as by sharing knowledge and fostering a global community. We want to create value for those we are seeking to influence, thereby maximising the positive impact for society. We focus on tools and approaches to put this shift in resilience thinking into practice, identifying the drivers and enablers for infrastructure resilience, and advancing a common understanding of resilient systems, within and between critical infrastructure sectors.

THE RESILIENCE SHIFT

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