

<b>Institution:</b> Cranfield University		
<b>Unit of Assessment:</b> 17		
<b>Title of case study:</b> Transforming standards of organisational safety and resilience		
<b>Period when the underpinning research was undertaken:</b> 2008 to present		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name(s):</b>	<b>Role(s) (e.g. job title):</b>	<b>Period(s) employed by submitting HEI:</b>
David Denyer Elmar Kutsch Colin Pilbeam	Professor Associate Professor Reader	2002 - present 2007 - present 2000 - present
<b>Period when the claimed impact occurred:</b> 2013 to present		
<b>Is this case study continued from a case study submitted in 2014? Y/N No</b>		
<b>1. Summary of the impact</b> (indicative maximum 100 words)		
<p>Now, more than ever, the ability of organisations to anticipate, prepare for and adapt to shocks and sudden disruptions in order to survive and thrive is critical. Cranfield's research into safety, risk and resilience from 2008 to present has established a new perspective and has provided meaningful guidance to organisations about the practical steps necessary to strengthen resilience for long-term success. Impact can be seen in the establishment of a new British Standard for Organisational Resilience; an improvement in Safety and Airspace Regulations for the UK Civil Aviation Authority, policy building in the European System of Central Banks and enhanced safety, risk and resilience outcomes for public and private sector organisations in the UK and internationally through application of Cranfield frameworks and models.</p>		
<b>2. Underpinning research</b> (indicative maximum 500 words)		
<p>Cranfield's research into safety management, risk management, high reliability organisations and organisational resilience over the period 2008 to the present has been widely disseminated and applied by organisations within the UK and internationally and as such, has been impactful in reducing harm from disruptive events and ensuring the continuity of critical services and building organisational resilience and effectiveness.</p> <p>Cranfield's research into risk and safety management has contributed to a greater understanding of the barriers and enablers to effective and proactive management and organisational practice.</p>		
<b>Risk</b>		
<p>Research into risk management practices carried out by Cranfield found that the existing approach of classifying the probability and consequence of known threats and connecting vertically from strategic or policy objectives to individual components, such as infrastructure, applications or operational processes, needed to be supplemented with a more mature and pervasive approach [R1] that connects horizontally across the 'end to end' delivery of essential services and focuses on adaptive capacity and recovery capabilities, based on the principles of high reliability organisations [R2]. The research also found that engagement with risk management practices was driven by five beliefs: <i>legitimacy</i> (the need to apply "best practice" standards); <i>value</i> (risk management must be demonstrably useful); <i>competence</i> (ability to</p>		

control risk); *fact* (risks need to be tangible, perceptible and real) and *authority* (the need to have the power or authority to act) [R3].

### Safety

Cranfield carried out a funded project for the Institution of Occupational Safety and Health (IOSH) between 2013 and 2015 into safety leadership practices in low hazard/service sector organisations. The resulting report identified management practices across sectors that both contribute to and limit safety and resilience [R4]. Cranfield also undertook a further funded research project for the IOSH into managing safety following organisational change through outsourcing, with a final report produced in 2019. [R5]

The University was commissioned in 2016 to undertake a safety assurance review for the UK's Civil Aviation Authority (CAA), the world's leading aviation safety regulator, of its Safety and Airspace Regulation Group (SARG). In order to gain acceptance and credibility, the CAA needed their approach to safety assurance to be underpinned by the very latest research evidence. The review led to over 100 recommendations and the development of a bespoke Safety Maturity Model as a methodology for CAA safety assurance activities, that could be embedded as an ongoing function and the development of a maturity model [R1], which is used to assess progress.

### Resilience

The concept of organisational resilience was further developed by Professor David Denyer using the Cranfield research synthesis methodology, which pulled together extant knowledge in the areas of safety, risk, crisis management [R6] and high reliability organisations [R2]. This concept built on previous approaches by providing an integrated, holistic framework, which acknowledged the crucial role of organisational behavior and culture, together with a methodology for diagnosis and implementation by organisations [R7&R8]

The Tension Quadrant framework and 4Sight methodology [R7], derived from the research, take a strategic, performance-based, organisation-wide perspective to organisational resilience. The Tension Quadrant framework identifies four ways of thinking about Organisational Resilience: preventative control (defensive consistency), mindful action (defensive flexibility), performance optimization (progressive consistency) and adaptive innovation (progressive flexibility). An additional element of the Tension Quadrant framework is the need for senior leaders to manage and balance the tensions between the four approaches through paradoxical thinking if organisations are to be truly resilient. The 4Sight methodology helps those in leadership roles throughout the organisation introduce and sustain organisational resilience by developing four key practices: foresight, insight, oversight, and hindsight.

The research has provided the means for shifting standard management thinking from purely defensive measures and prevention, to the need for flexibility and agility, leveraging opportunities and driving innovation, helping organisations to remain competitive in challenging conditions.

### 3. References to the research (indicative maximum of six references)

- [R1] Maelshagen, C., Rocks, S., Pollard S. and Denyer, D. (2011), 'Risk management pervasiveness and organisational maturity: a critical review', *International Journal of Business Continuity and Risk Management*, Vol. 2, No. 4, pp. 305-323  
<https://doi.org/10.1504/IJBCRM.2011.044405>
- [R2] Denyer, D., Tranfield, D. and Van Aken, J.E., 2008. 'Developing Design Propositions through Research Synthesis', *Organization Studies*, Vol. 29, No. 3, pp. 393-413. <https://doi.org/10.1177/0170840607088020>

- [R3] Kutsch, E., Denyer, D., Hall, M. and Lee-Kelley, L., 2013, 'Does risk matter? Disengagement from risk management practices in information systems projects', *European Journal of Information Systems*, Vol. 22, pp. 637-649. <https://www.tandfonline.com/doi/full/10.1057/ejis.2012.6>
- [R4] Pilbeam, C., Davidson R., Doherty, N. and Denyer, D., 2016. Safety leadership practices for organizational safety compliance: developing a research agenda from a review of the literature", *Safety Science*, 86, pp 110-121. <https://doi.org/10.1016/j.ssci.2016.02.015>
- [R5] Pilbeam, C., 2019. "Managing safety in outsourced relationships", IOSH Research Report. (See *Corroborating Evidence zip file*)
- [R6] Buchanan, D. and Denyer, D., 2013, 'Researching tomorrow's crisis: methodological innovations and wider implications', *International Journal of Management Reviews*, Vol. 15, No. 2, pp. 205-224. <https://doi.org/10.1111/ijmr.12002>
- [R7] Denyer, D. 2017. 'Organizational Resilience: A summary of academic evidence, business insights, and new thinking'. BSI and Cranfield School of Management. (See *Corroborating Evidence zip file*)
- [R8] Goffin, K., Szejcowski, M., Kutsch, E. 2016, 'Roads to Resilience: Building dynamic approaches to risk to achieve future success', AIRMIC and Cranfield School of Management. [https://dspace.lib.cranfield.ac.uk/bitstream/handle/1826/8679/Roads\\_to\\_resilliance-2014.pdf?sequence=1](https://dspace.lib.cranfield.ac.uk/bitstream/handle/1826/8679/Roads_to_resilliance-2014.pdf?sequence=1)

#### Details of the impact (indicative maximum 750 words)

##### Risk Management and Safety Assurance

Cranfield's research into safety assurance has supported the ambition of the UK's Civil Aviation Authority (CAA) to achieve a transformation from compliance-based regulation to performance-based regulation of aviation safety in the UK. Ben Alcott, Director, International Group has described the impact of the Cranfield risk and safety research as follows:

*"This comprehensive, evidence-based analysis of the CAA's work has had a long-standing impact on the organization, including the improvement of our safety culture, ways of working, thoughtful analysis and learning."* [S1]

The success of the review has also had far reaching consequences, with the European Union Aviation Safety Agency (EASA), also adopting the principles of the Safety Maturity model, which will be rolled out to encompass 27+ European national Aviation Authorities and will provide the agency with a more holistic view of Member State performance [S2]

Cranfield's Safety Maturity model was also adopted for application within an international helicopter company providing offshore transportation and search and rescue services through operations in the UK, Norway, Turkmenistan, Australia, Nigeria, Trinidad, Guyana and the Gulf of Mexico. Former Safety Director (now CEO of HeliOffshore), reported:

*"The tool ..resulted in each operation determining their own SMS maturity rating as well as identifying over 70 agreed actions across the organisation which were incorporated into regional Safety Improvement Plans and tracked towards completion."* [S3]

Cranfield research-based models of safety leadership have been widely disseminated via IOSH training programmes and applied work with organisations. Siemens [S4] has used the Cranfield Outsourcing Safety framework to ensure maximum understanding, alignment and performance effectiveness between itself and its German sub-contracting parties in the initial stages of a new power plant build. The aim was to create a “Partnership” between the Contractors and Siemens, based on understanding / commonality. The results have been very encouraging, both from the Contractors and Siemens internally. Any issues on site have been much easier to resolve due to the partnership in place. Siemens is now compiling a Contractors Policy / Guidance based on the models used in the project to be shared more widely.

### Resilience

BSI (British Standards Institution) BS 65000 Guidance for Organisational Resilience, published in November 2014, was built on the foundation of research work at Cranfield [S1]. BS 65000 was described as a “*landmark standard*”, critical for the integration of crisis management and business continuity management, and in achieving a new level of coherence in the approach of organisations. [S5]

The European System of Central Bank’s Taskforce for Organisational Resilience has applied Professor David Denyer’s academic research into organizational resilience to formulate its baseline policy approach, assessment and application toolset and implementation guidelines. Organisational resilience capabilities are seen to be of the utmost importance to the organisations represented on the Taskforce. Central banks function to mitigate economic, financial and social risks via their monetary, currency and prudential policy actions. As such, the ability to effectively respond to change and disruption within their operating environments is critical to sustainably delivering on policy objectives and maintaining credibility, whether in respect of financial and monetary operations, or regulation of financial services.

*“Through the application of the research, it became apparent that the toolsets could be applied both within and across a range of related organisations, providing insight at both an “enterprise” and “system” level. This was of particular value to the work of the Taskforce in that the multi-level application is directly relevant to the structure of the Eurosystem central banks (i.e. countries operating the Euro currency) where an integrated and harmonized approach to developing resilience is of critical importance.” [S6]*

Application of the Tension Quadrant framework has been used by organisations to maintain resilience during the Covid-19 pandemic. Managers from Personal Group attended a workshop on the framework two months before the start of the Covid-19 lockdown in the UK. Although the organization had done risk modelling exercises previously, they had remained a theoretical exercise. Rebekah Tapping (HR Director) reported:

*“the work we had done on the Strategic Tensions (Tension Quadrant) enabled us to maximise the opportunity to diversify as a result of the changes to our traditional ways of doing business that were impacted by the Lockdown and continuing COVID restrictions.” [S7]*

AIRMIC - the Association of Insurance and Risk Managers in Industry and Commerce Ltd - conducted an independent survey of 152 risk managers to evaluate the impact of Cranfield’s ‘Roads to Resilience’ research [S8]. The study also took the views of a number of associated professions, Chartered Institute of Personnel and Development; Chartered Insurance Institute, Business Continuity Institute; Association of Chartered Certified Accountants; Chartered Institute of Internal Auditors and the Institute of Risk Management. The survey used Cranfield’s five principles of resilience as the yardstick for measuring progress in improving resilience. Most respondents indicated that their organisations have embedded, to some extent, the five principles, with particular progress being made on ‘rapid response’, ‘review and

adapt', and 'relationships and networks' , with 48%, 34% and 33% having fully embedded the principles respectively.

**5. Sources to corroborate the impact** (indicative maximum of 10 references)

- [S1] Testimonial from Director, International Group, CAA
- [S2] CAP1642: Safety Assurance Review:  
<https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=8268>
- [S3] Testimonial from Chief Executive Officer, HeliOffshore
- [S4] Testimonial from Head of Governance UK&I, Siemens Energy Ltd
- [S5] Testimonial from Group Director Assurance Services, BSI Group
- [S6] Testimonial from Head of Risk, Central Bank of Ireland
- [S7] Testimonial from HR Director, Personal Group
- [S8] AIRMIC survey  
[https://dspace.lib.cranfield.ac.uk/bitstream/handle/1826/8679/Roads\\_to\\_resilliance-2014.pdf?sequence=1](https://dspace.lib.cranfield.ac.uk/bitstream/handle/1826/8679/Roads_to_resilliance-2014.pdf?sequence=1)