

# Assessing Safety Culture: recent developments and lessons learnt

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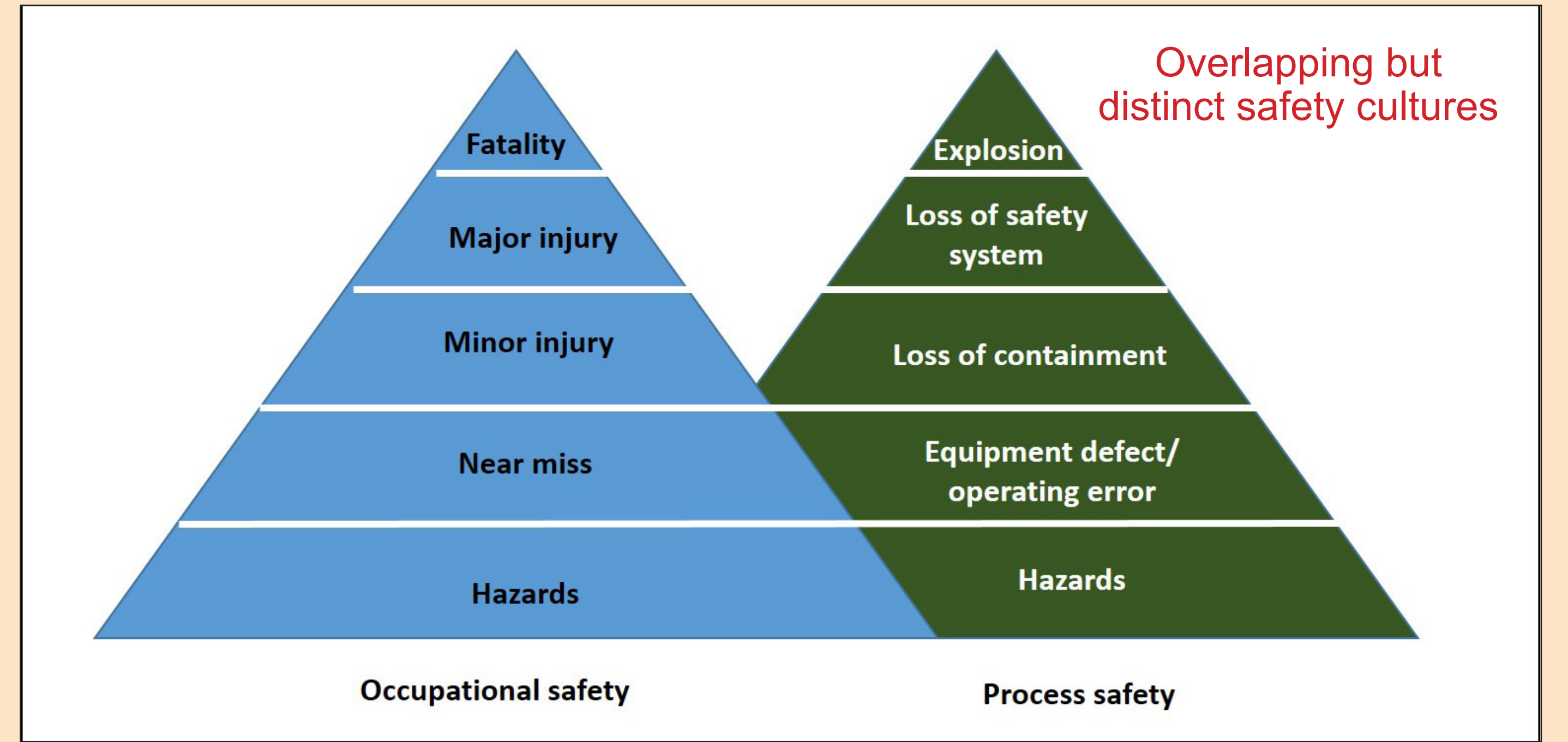
## Divergent safety attitudes and behaviours

An organisation's safety attitudes and behaviours can vary from one aspect of safety to another. The 2005 Texas City explosion exemplified how an organisation can excel in one area (personal safety), yet fail in another (process safety).

"BP has emphasized personal safety but not process safety" and "...a very low personal injury rate at Texas City gave BP a misleading indicator of process safety performance" (Independent Safety Review – The 'Baker Report').

Differences between safety domains are related to:

- The organisation's perception of the risk.
- Competing business objectives.
- Organisations may formalise policies and performance measures for a single area of safety.
- Different aspects of safety are often managed by different departments.
- There are many examples of domain-specific regulations.



## Implications for safety culture assessment

Preliminary work, e.g. workshops, can explore how the organisation conceptualises safety. It may promote a holistic view of safety, for which a single assessment of safety culture can be valid. Where there is evidence of specific safety cultures, this may necessitate independent or parallel assessments. Irrespective of whether there is a single or multiple safety domain, a clear definition of the area of safety being assessed should be stated, such as at the outset of questionnaires, ideally with examples of relevant hazards.

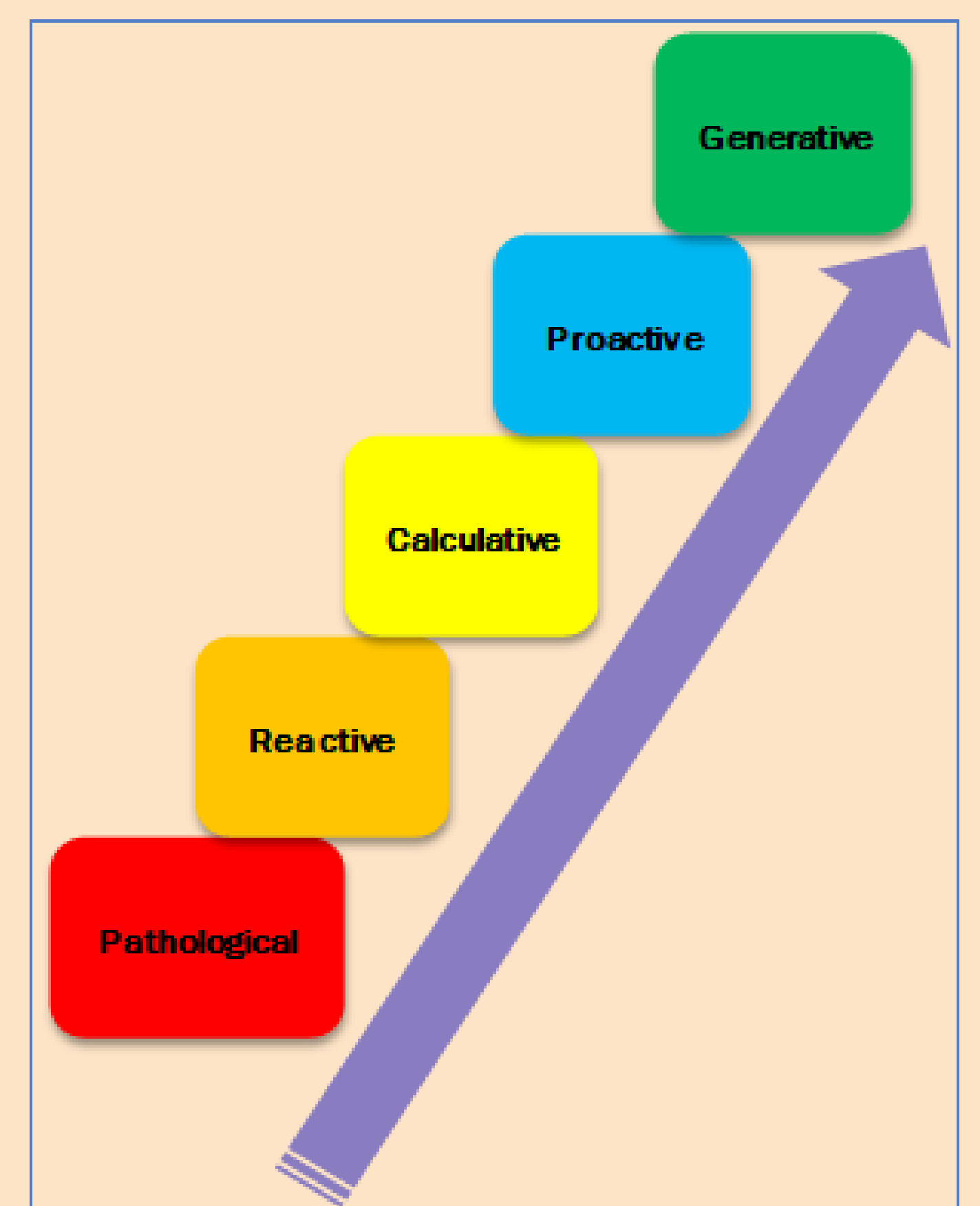


Figure 1: Pathological to Generative culture maturity

Scale	Score (1 to 5)
Generative	≥4.5
Proactive	4 to 4.49
Managing	3.5 to 3.99
Reactive	3 to 3.49
Dysfunctional (Pathological)	<3

Figure 2: Categorical assessment scale

## Assessing and interpreting results

Some questionnaires provide results in terms of the proportion of staff who agree or strongly agree that there is, for example, effective safety leadership. This is useful with respect to identifying relative strengths and weaknesses. However, there can also be a need to assess the level of maturity in absolute terms, and to compare results. For example, if 70% of staff agree there is effective safety leadership, is this 'good enough'? Acquiring safety culture results for other organisations is, often, impractical. In addition, a wide range of safety culture methods are used, with different measurement methods and question sets. There are examples of questionnaire survey scores being assessed using categorical scales. In our work with BAE Systems we used a variation of the Pathological to Generative scale, as per Figure 1. The scale, in Figure 2, enables an absolute assessment to be made of the level of safety culture maturity and comparison with the standards expected of comparable safety critical organisations.

## Common elements of safety culture

Another key question is, what elements of safety culture should be assessed? Safety culture assessment tools, guides and frameworks were reviewed to identify a common set of safety culture elements measured and/or described by these instruments (Lockwood et al., 2015). These elements were tested and consulted on, including a factor analysis and a reliability analysis (Cronbach alpha) of questionnaire responses. The results supported one overarching attitude towards safety.

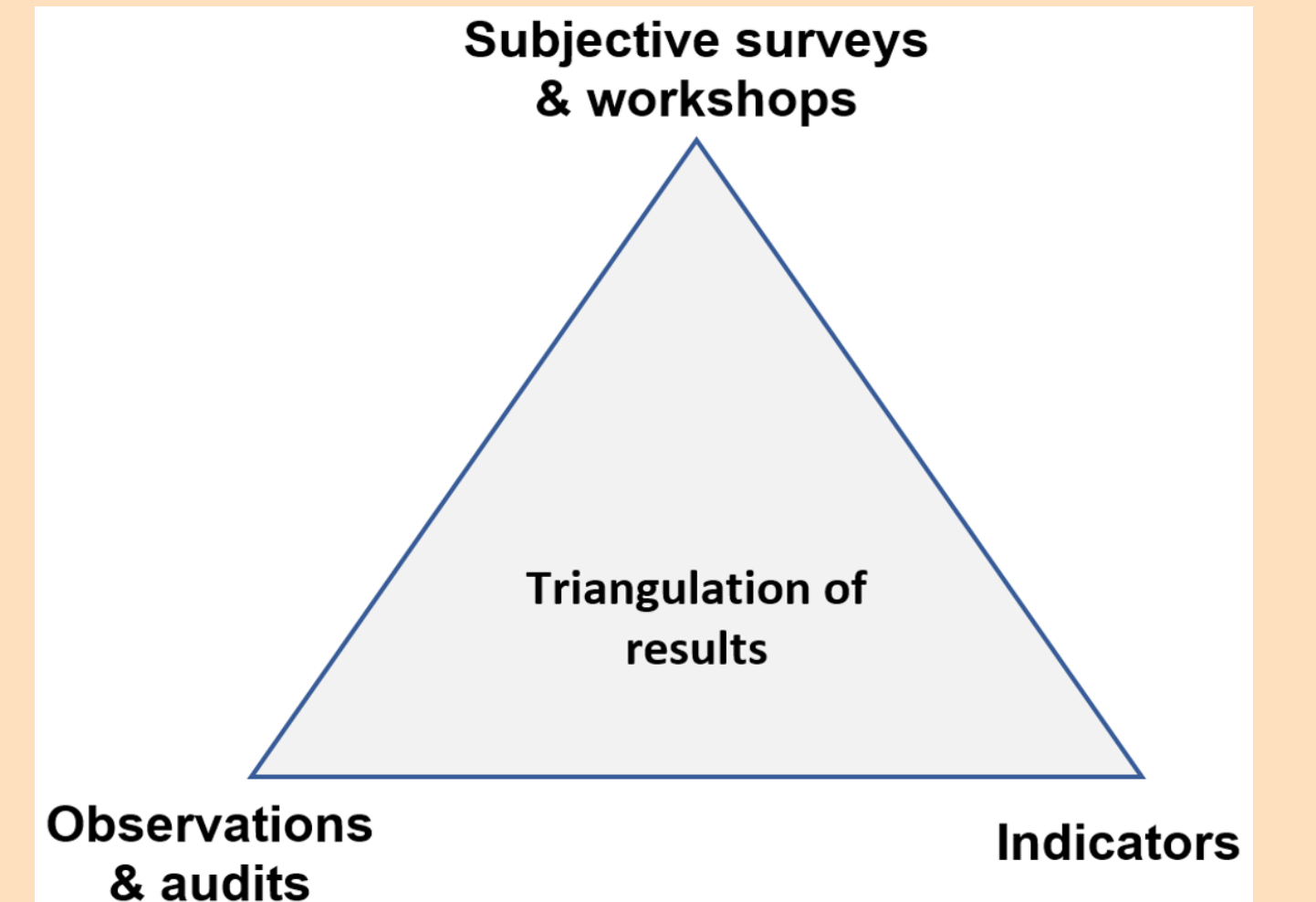
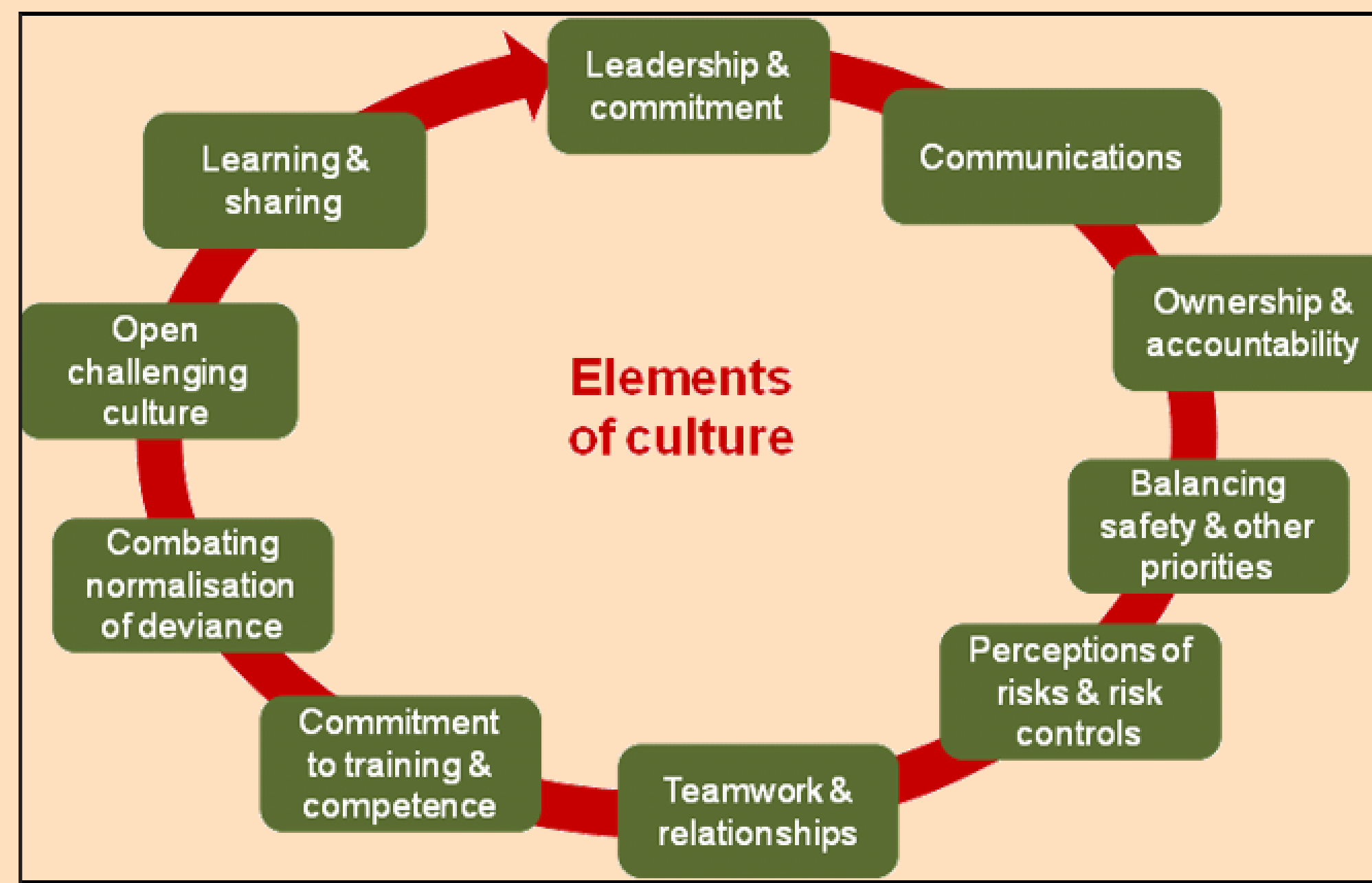


Figure 3: Triangulating assessment results

## Multi method assessment

Whilst some assessments use a single tool, such as questionnaires, others have moved towards a toolkit approach. A multi method assessment helps to boost the confidence in results by triangulating results (see Figure 3) and fulfils the complementary goals of both measuring and understanding safety culture. The aforementioned work by BAE Systems (Lockwood et al., 2015) involves the selective use of:

- Questionnaires
- Perceptions workshops
- Observations
- Review of documentation
- Leading and lagging indicators
- Root cause analysis
- Diagnostic focus groups

All methods align to the Pathological (re-termed Dysfunctional for BAE Systems) to Generative scale and a common set of safety culture elements. This allows results from each method to be compared and assessed, and provides a greater weight of 'evidence'.

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## Lessons learnt

- Verify whether a holistic safety or domain-specific assessment is required
- Use a categorical assessment to gauge maturity and compare results
- Use multiple methods to boost the level of confidence
- Use qualitative assessment for an in depth understanding

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Baker, J., Bowman, F., Erwin, G., Gorton, S., Hendershot, D., Leveson, N., Priest, S., Rosenthal, I., Tebo, P., Wiegmann, D., and Wilson, L. The BP U.S. Refineries independent safety review panel. January 2007. [http://www.csb.gov/assets/1/19/Baker\\_panel\\_report1.pdf](http://www.csb.gov/assets/1/19/Baker_panel_report1.pdf)

Lockwood, F., Canham, R. & Wright, M. (2015) Developing a framework for assessing Workplace and Product Safety culture in BAE Systems. In Proceedings volume of the 2015 Safety-critical System Symposium (SSS'15). [http://scsc.org.uk/paper\\_129/Lockwood - Developing a Framework for Assessing Workplace and Product Safety Culture in BAE Systems.pdf?pap=980](http://scsc.org.uk/paper_129/Lockwood_-_Developing_a_Framework_for_Assessing_Workplace_and_Product_Safety_Culture_in_BAE_Systems.pdf?pap=980) Both accessed December 2016.