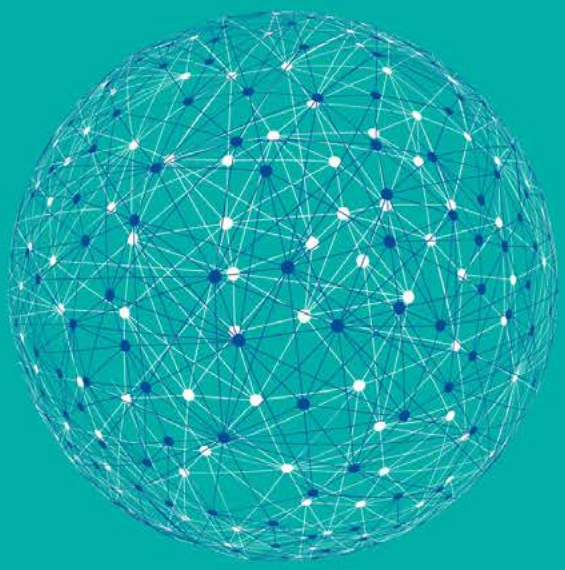
KPMG

Dynamic Risk Assessment

The power of four

An evolution in risk assessment that applies sophisticated algorithms and advanced data analytics together in a KPMG proprietary methodology to identify, connect and visualise risk in four dimensions.



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Why is Dynamic Risk Assessment different?

KPMG's Dynamic Risk Assessment (DRA) marks a ground-breaking shift in risk identification. DRA was developed to provide clients with a better understanding of the risks their organisations face in today's complex world of developing technology, emerging markets, climate change, growing populations and other mega-trends that interact and shape our future.

DRA takes an unprecedented approach to gaining insights into risk environments — by pinpointing central risks and shedding new light on the effectiveness of controls.

Management and Boards often ask:

- How do the many operational risks aggregate and interrelate to impact the overall summarised risk profile presented to the Executive and the Board?
- Do we have a complete understanding of our risk profile or are there emerging risks or structural breaks (macroeconomic, socio-political and other megatrends not necessarily previously observed) that are not being addressed?
- If a risk event was to occur, how quickly would it adversely impact the business?
- How can we go beyond operational resilience to using risk to create opportunity and competitive advantage?
- Are our resources being applied as efficiently and effectively as possible to achieve a risk outcome commensurate with our risk appetite?

Traditional risk management approaches do not lend themselves to being able to answer these questions because they typically:

- Consider risks individually with linear relationships (if any) between them.
- Identify "significant" risks on an individual basis rather than reflecting the cumulative effect of interconnected risks forming a cluster with potentially a far greater likelihood and/or consequence in aggregation.
- Aggregate multitudes of operational risks, to obtain a top level risk profile through qualitative and subjective means based on averages or worse case scenarios. The outcome thus often lacks rigour and cannot withstand scrutiny.
- Grossly underestimate risk contagion within the network, as well as velocity of impact. Notwithstanding that experience shows that failures typically result from a number of risk events occurring simultaneously or within a short space of time so that historic, single risk mitigation strategies become ineffective.
- Design mitigation strategies on a risk by risk basis with limited understanding of where resources should best be applied to achieve a reduction in risk across the entire risk network.

The power of considering all four dimensions of risk overcomes these limitations and enables the transformation of risk into opportunity.

The power of four

Looking beyond conventional depictions of risk, typically based solely on likelihood and severity, Dynamic Risk Assessment takes a four-dimensional view by including connectivity and velocity. This enables consideration of the contagion effect of risks – one of the most significant learnings from the Global Financial Crisis.

In these turbulent times, organisations need to approach risk assessment with fresh thinking and innovative solutions. As economic volatility becomes the norm, and the past is no longer an indicator of things to come, seemingly disparate events can become inextricably linked. This makes assessing risk exposure especially difficult because risk is unpredictable and contagious, and connected globally within complex organisational structures.

Focus needs to shift. It's increasingly important to understand and monitor emerging risks and be aware of what out of trend risks (structural breaks) could arise in this age of disruption.

Equally, as global organisations expand their reach beyond traditional geographic and sector boundaries, they not only create new opportunities, but also expose themselves to potential new risks. At the same time, organisations are being influenced by macro-economic, socio-political and other mega-trends not necessarily observed in the past.

Recognising that past data and assumptions are severely limited in a world of developing technology, emerging markets, climate change, growing populations and other mega-trends that interact and shape our future, KPMG's risk professionals are well positioned through DRA to be able to help you turn risk into opportunity and increase resilience while disruption and volatility unfold.

A turning point

At KPMG we realised that a turning point has been reached where traditional, two-dimensional risk management methodologies (that focus on single points of risk with high likelihood and severity) may be limiting the value of risk management in increasingly complex and global organisations. Extending from this is the realisation that the ability to understand an organisation's risk interrelationships can be significantly improved if we find a way to identify potential risk contagion.

Dynamic Risk Assessment is the key with which those deeper insights can be unlocked. It is an evolution in risk assessment that applies actuarial theories, sophisticated algorithms and advanced data analytics together in a KPMG proprietary (patent pending) methodology to identify, connect and visualise risk in four dimensions:

- **Likelihood**
- **Impact**
- **Velocity**
- **Connectivity**

Combining the latest in applied science with insights from management and extensive benchmarking, DRA modelling allows our risk professionals to see where risks can be expected to form critical clusters or trigger other risks through 'contagion'.

By exposing the expected contagion effects between global and enterprise risks, we can objectively measure the genuinely significant threats. These may not be the risks with the highest impact individually, but rather the risks with the most significant connections and, hence, the ability to trigger several risks in a short time frame.

These fresh insights provide clients with new insights to drive more informed decision making within their organisations on how to best tackle and monitor these threats and, where possible, create opportunity.

Dynamic Risk Assessment explained

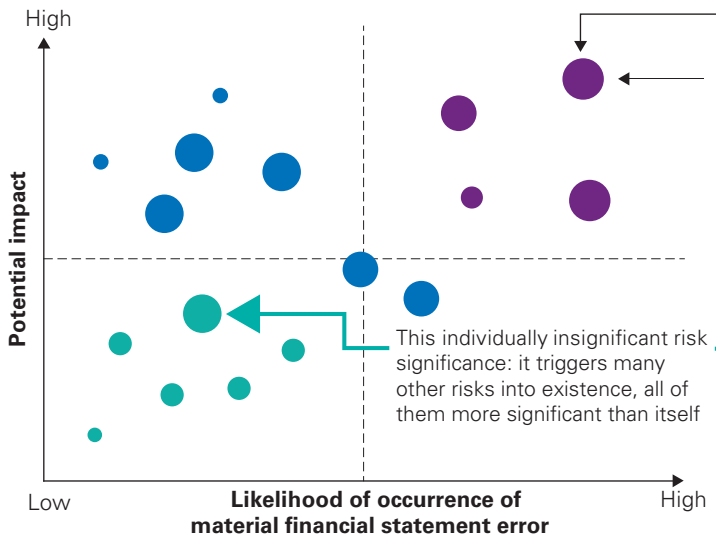
KPMG's Dynamic Risk Assessment ("DRA") methodology applies network theory to identify expected contagion between structural breaks, global risks, mega trends and organisational risks.

We model this expected contagion through working with experienced individuals from across your organisation and applying the findings of published research into network theory to produce a bespoke systemic risk network for your organisation, as well as a comprehensive analysis of the characteristics of your risk network.

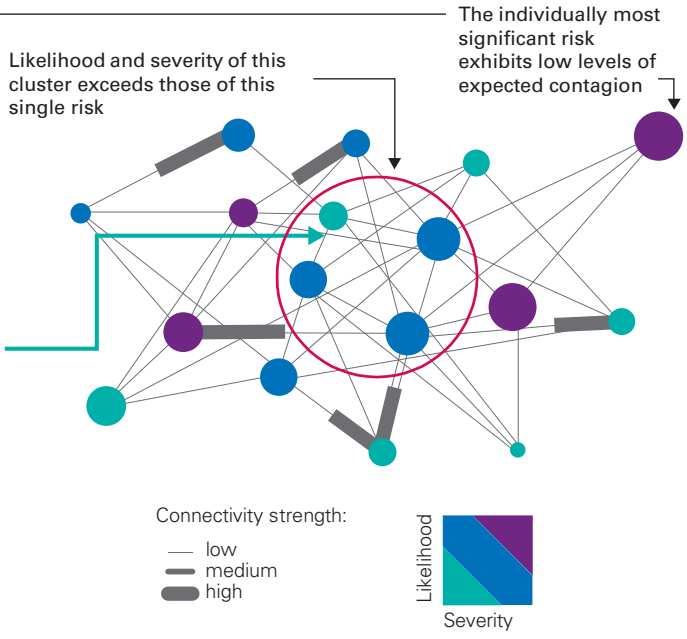
In short, KPMG applies advanced mathematics and analytical tools to produce an understandable and personalised system risk network report.

This process enables the move from a two dimensional view of independent risks to an interconnected view of the four dimensions of risk – Likelihood, Impact, Velocity and Connectivity.

Traditional, two dimensional risk map



Inter-connected view

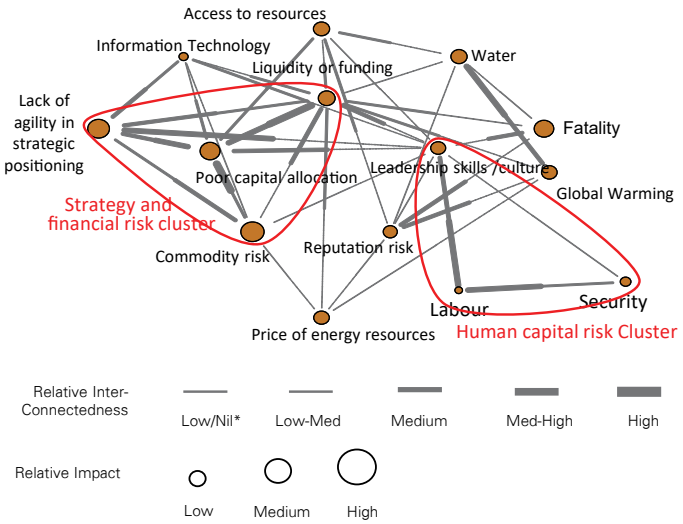


Risk Interconnectedness and Clusters

Interconnectedness

Interconnectedness assists with more holistic risk management by illuminating an additional dimension which shows the impact risks have on each other. Groups of strongly related risks are called risk "clusters". These are relevant because organisational failures are seldom the result of a single risk event but are more typically the consequence of a number of related risks materialising at the same time.

Risk clusters are determined mathematically by analysing a number of factors. All risks within a cluster are likely to either trigger/make another risk more severe or be triggered/made more severe by other risks in the cluster.

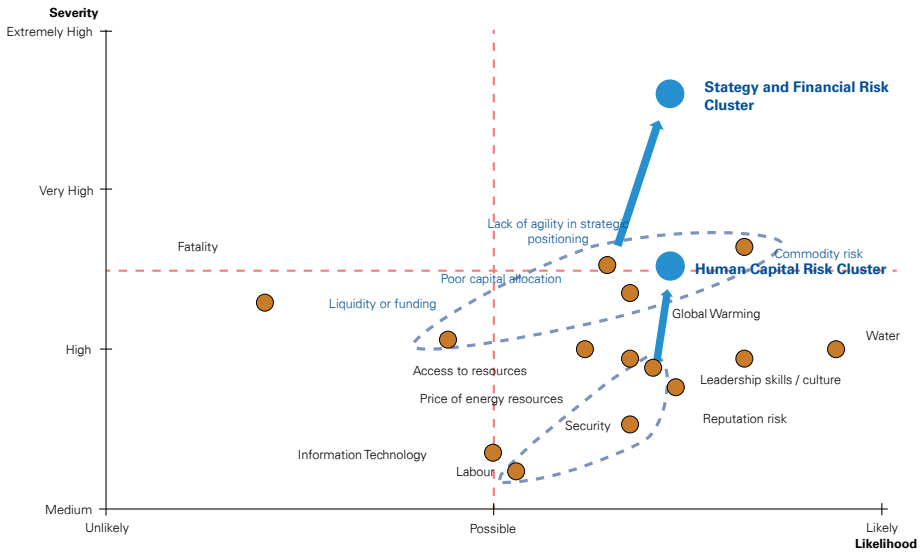


The domino effect

Whilst individual risks may not be regarded as significant due to their assessed likelihood and impact, it may change when the risks are considered in combination considering clusters. Risks in a cluster can be subject to the "domino" effect and this effect can be mathematically quantified such that the collective impact and likelihood of the cluster as a whole can be understood. By understanding the overall impact and likelihood of connected risks, appropriate resources can be allocated.

The illustration below depicts how the labour, security and leadership skills/culture risks (bottom right) are individually rated to have an impact which is not considered to be "High". However, due to the cumulative impact of these risks collectively, this cluster of risks has an impact which is between "High" and "Very High". Their collective likelihood has increased slightly as well.

In this way DRA is superior to traditional aggregation techniques which, in order to determine the rating of a number of risks together, will often take either the average of the risk ratings of a group of risks, or alternatively, the highest rated risk. Using either of these methods in the scenario below would have reported a much lower risk outcome than what DRA does using established science.



Positive risk contagion

An added advantage of understanding interconnectedness is that it enables management to understand which risks have the strongest connections and, hence, where resources should be allocated for maximum benefit.

In the current environment, it's important to ensure that any capital allocated will have the maximum impact possible. By understanding the connections between risks, and consequently which risks trigger others (compared to those that are triggered by others), the vulnerable points in the network can be identified. These are the risks which "must go right" for the other risks to not be triggered.

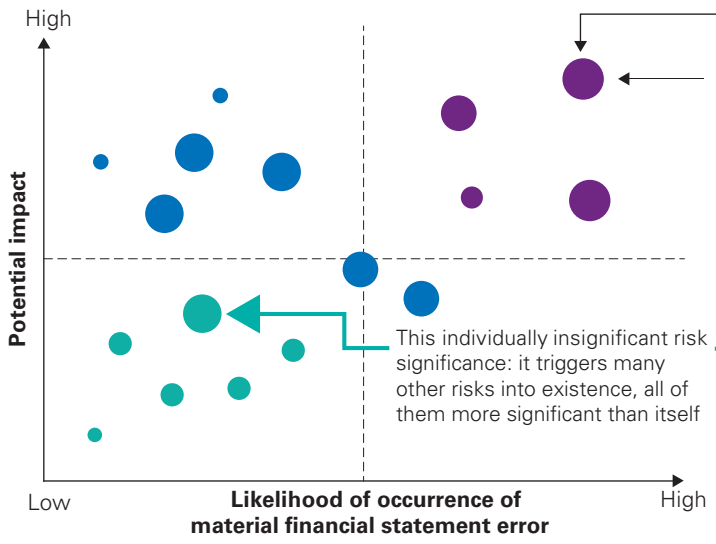
In a capital conscious environment it's these interwoven points of vulnerability which should be allocated the most resources.

This differs to traditional risk management thinking whereby the risks outside of appetite are typically allocated the most resources.

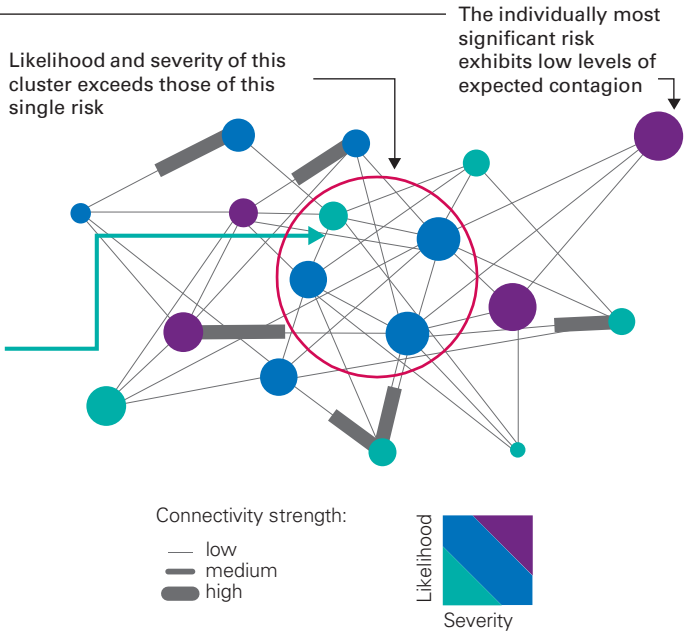
Whilst the traditional approach may reduce the risk to a rating within appetite, only one risk is typically mitigated, which has little impact on the risk network a whole.

We quite often find that the points of vulnerability (the risk which must go right) are within appetite and hence are not being closely managed or monitored. Allocating additional resources to these risks rather than to those outside of appetite can equate to a cost saving. This is because treating this one very connected risk has flow on implications to the whole network thereby creating an opportunity to bring numerous risks back within appetite.

Traditional, two dimensional risk map



Inter-connected view



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