Defining and Measuring KxIs:
Key Risk/ Performance/ Control Indicators

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Defining & Measuring Key Indicators

1) **WHY manage risks?**
2) **HOW can key indicators (KxIs) help?**
3) **WHAT does this mean for ecosystems?**
4) **WHERE do we go from here?**

Appendix: References, KxI Framework considerations

1) WHY manage risk?

What are the

two most important

key strategic objectives

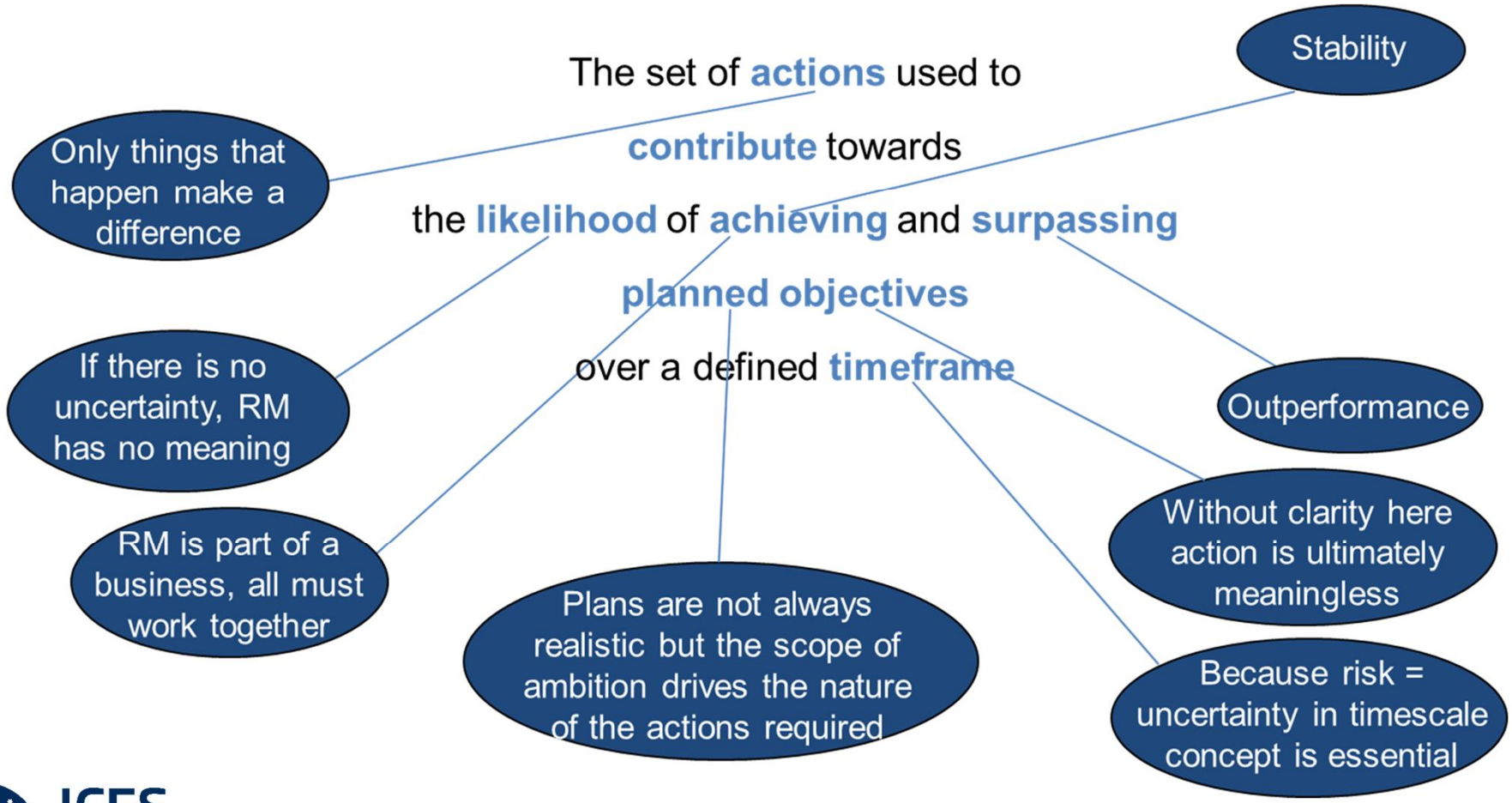
of any organisation

- or ecosystem?

Survival…

…with a long-term sustainable benefit!

Risk Management =



2) HOW can key indicators (KxIs) help?

Definitions

- **Key Risk Indicators (KRIs)**:
  → *are metrics, selected to indicate the **probability & impact of risks** that - if crystallised - would undermine organisational / ecosystem objectives.*

- **Key Performance Indicators (KPIs)**:
  → *are metrics thresholds, selected & monitored to indicate the organisational / ecosystem **performance** in achieving its strategic / policy goals.*

- **Key Control Indicators (KCIs):**
  → *are metrics thresholds, selected & monitored to indicate when organisational / ecosystem **controls are breached** by risks crystallising that are – without any intervention – detrimental to the achievement of its objectives.*

*KPIs provide assurance. **Breached KCIs must trigger action.***

Design principles: Key indicators should be…

- using information / metrics that are already **collected and available**
- **meaningful** (well known and understood) to the scientific community
- giving a high level of confidence in their **accuracy**
- of sufficient **data quality**
- based on **a reasonably high volume of occurrences**

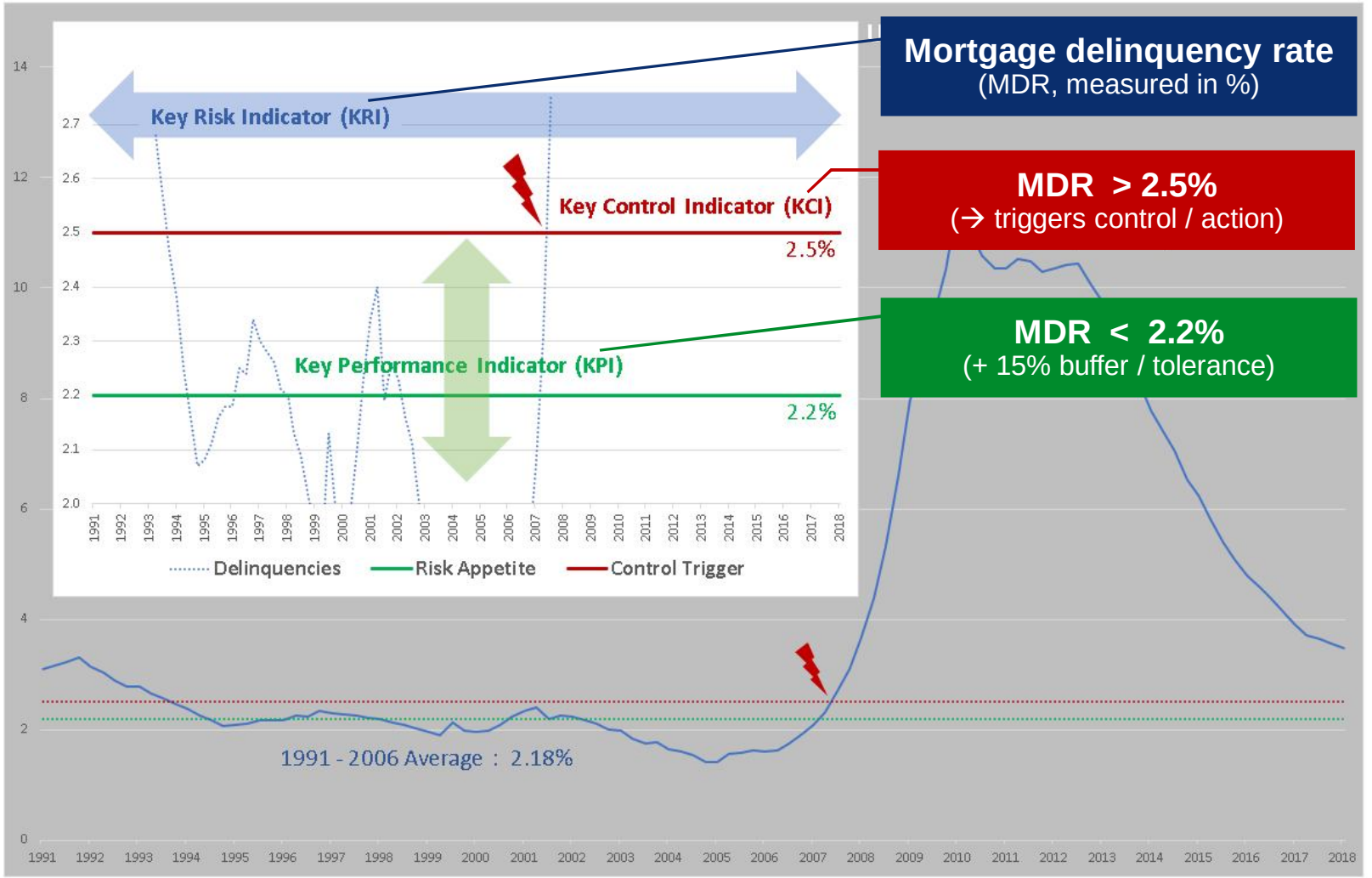
  (a one-off incident is probably a loss event)
- **measurable** (quantity, position, value, etc.)

Benefits of KxIs

- **Monitor** organisational (or ecosystem) performance (KPIs)
- **Identify** the risk of / actual changes to organisation (or ecosystem; KRIs) goals
- Provide a **visual / graphical comparison** of as-is-state vs. desired state (KxIs)
- Function as **“early warnings flags”** of the deterioration of conditions in an organisation (or ecosystem) by using soft / hard control triggers (KCIs)
- Provide possible indication of **‘causal’ risk situations** (KRIs) & counter-action
- Provide **quantitative & focused measurements** of change (KPIs)
- Provide a basis for risk **mitigation** or performance **improvement** (KxIs)

→ **Ultimately, form a solid basis for INFORMED decision-making!**

Financial Key Indicators (Example)



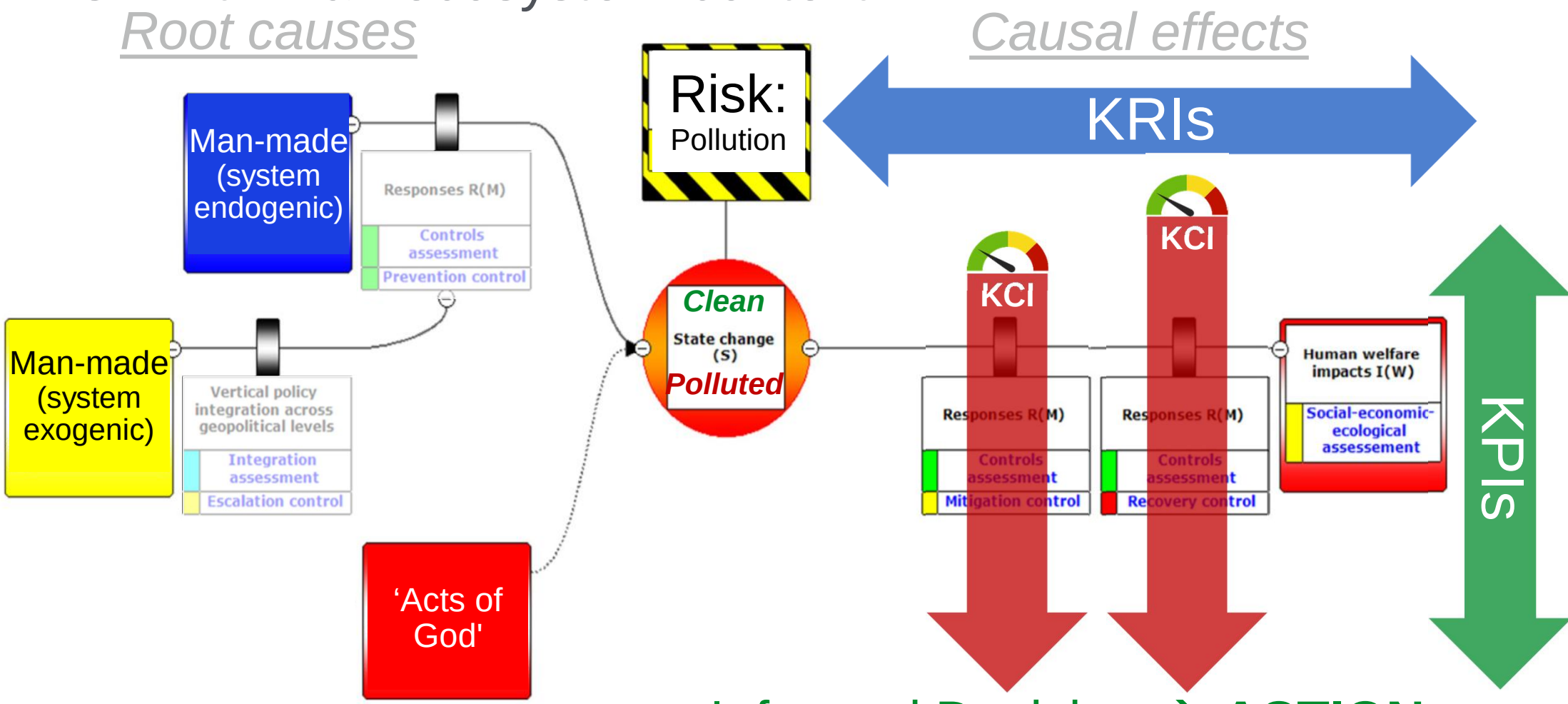
Mortgage delinquency rate
(MDR, measured in %)

MDR > 2.5%
(→ triggers control / action)

MDR < 2.2%
(+ 15% buffer / tolerance)

3) WHAT does this mean for ecosystems?

KxIs - within an ecosystem context



Informed Decision → **ACTION**

KxIs Framework Considerations

- **General metric attributes:**

  Primary usage; Other usage; Measurable; Measured now?; Global metric; Time period (coincident / leading / lagging); Latency; Availability; Minimally correlated

- **Data attributes:**

  Unit; Delivery (automated / manual); Source; Source name; Cost-effectiveness; Steward; Quality control process (Review/ Attestation / Detailed reconciliation); Historical availability; Retention period

- **Storage / Capture:**

  Storage location; Centralised data repository; Structure of the KxI data points (Metric ID / Date-Timestamp / Data point);

- **Threshold / Trigger management:**

  Threshold calibration; Roles & responsibilities within threshold determination & management; Threshold log (records set of thresholds for the KRI and associated action / audit trail of any changes to thresholds)

- **Monitoring / Usage / Reporting:**

  Expectations & standards for using KxI data; KxI data must be the source of truth for that piece of information; Tracking vs. Trending; Minimum number of required data points for trend analysis (cycles)

- **Effectiveness / Governance:**

  Effectiveness reviews focussed on Data quality / data collection / threshold sensitivity / Follow-through / KxI strength

Ecosystem analogy: a fish tank – anything but simple!

What could be suitable KxIs?

System 1
- Salinity / Light / Temperature
- Food availability
- Filtration / Plants / Corals
- Biodiversity

System connectivity

System 2
- Electricity
- Water supply
- Air

System connectivity

System 3
- Geographical / geo-political factors
- Country-specific legislation
- Global conventions (CITES / CMS)

4) WHERE do we go from here?

Good news = Plenty of data: **184mio** data points

Dataset	Measurements	No of years	Last Updated
Oceanographic	**159,098,461**	**129**	**18/02/2018**
Contaminants and biological effects	12,629,656	41	12/06/2018
Fish trawl survey	7,686,784	53	19/09/2018
Biological community	1,983,073	38	29/06/2018
Fish predation (stomach contents)	1,149,608	12	16/03/2011
Eggs And Larvae	1,073,423	95	03/11/2015
Historical datasets	334,837	58	21/02/2012

Proposed next steps

1. Use this working meeting to **discuss KxIs in a ecosystem context** further
2. Initiate / drive a **paradigm-shift: from pure *measuring* to *actioning***
3. Develop a **methodology pilot** that can be tried out
4. Identifying a simple set of **ecosystem-specific KxIs** that can be used
5. Real challenge: **Keep KxI numbers as low as possible** (10 – 30 KxIs)
6. Share the **new methodology** and findings widely (New paper / research)

Thank you / Takk fyrir!

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Appendix

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KxI Framework considerations (1 of 2)

Table 7.1 Typical roles and core responsibilities

Role name	Description
KRI leader	This person provides leadership and governance for the KRI programme.
Steward	This person is responsible for the collection, data quality confirmation, and posting the KRI information to the system or location as specified by the KRI framework. This may be the same person as the KRI owner in some cases.
KRI owner	This is the person responsible for the monitoring and first response to a KRI.
KRI analytics team	This is the person or team responsible for the aggregate analysis of the KRI population, and the senior management and board reporting of the interpretation of the information.

Table 7.2 RACI diagram (A is accountable; R is responsible; C is consulted; and I is informed)

Activity	Senior management	KRI leader	KRI analytics team	KRI owner	Steward	Functional leaders
Identification		A		R		
Assessment		A		C	R	
Collect data		A		C	R	
Ensure data quality		C		R	A	
Post data		I	I	R		
Establish thresholds		A		R		
Monitoring (aggregate)		A		R		
Monitoring (KRI level)		A		R		
Analysis (aggregate)		A	R			
Analysis (KRI level)		A		R		
Reporting (aggregate)		A	R			
Reporting (functional)		A	C	C		R
Evaluate effectiveness		A		R		I
Refine		A		R		I
Governance	A	R		R		R

Table 7.3 KRI metadata collections

KRI metadata	Description
Metric inventory	This is the foundation for the inventory of metrics, housing the identified metric and its description. Within this set of metadata is the complete change management history.
Relationship map	The relationship map provides the reference for how the KRI is used.
General attributes	General attributes provide a more granular view into usage, measurability, timing and strength of the KRI.
Data attributes	Data attributes indicate how to collect and store the information, including specific responsibilities for data quality.
Threshold log	The threshold log aligns the thresholds with the identified KRI, and provides a mechanism for capturing threshold revisions made over time.

Table 7.4 The metric inventory metadata

Metric inventory	
Metric id Name or identifier for the specific metric being measured	Metric description. Additional description to provide perspective on the metric and what is being measured.
Metric history	The history reflects a record of each status change associated with the metric.
Metric id	Name or identifier for the specific metric being measured.
Date	This is the date associated with the status and rationale.
Strength	A calculated score generated from the KRI assessment tool.
Is it key?	Yes/no – based on the score and a subjective view on whether this is a key risk indicator.
Status	Status indicates the state for the KRI within the lifecycle: initialised, revised deleted.
Rationale	This provides a reference to the rationale for status, particularly revisions or deletions. It may contain a linkage to the governance forum and discussion.
Escalation path	Default if there is one for the programme, or specific (eg, to a formal committee).

Source: Key Risk Indicators, Rodrigues, A. & Chadha, V., 17 Jan 2016

KxI Framework considerations (2 of 2)

Table 7.5 The relationship map metadata

Relationship map	
Metric id **Name or identifier for the specific metric being measured**	Relationship count. Number of relationships the KRI informs (must be at least one).
Relationships	There will be one row or record for each of the relationships identified by relationship count.
Relationship type **Strategic objective, risk, control**	Relationship reference. Reference to the specific relationship; the use of these references needs to be very consistent in order to optimise analysis, usage and reporting

Table 7.6 The general attributes of a KRI

General attributes	
Attribute	Input
Primary usage	Risk, control or performance
Other usage	Risk, control or performance
Measurable	Yes or no
Measuring now?	Yes or no (no indicates aspirational)
Global	Yes or no
Time period	Coincident, lagging, leading
Timing	Continuous, daily, weekly, monthly, quarterly, etc
Availability	Consistent (no lag), acceptable (mild lag), delayed (moderate lag), unacceptable (significant lag)
Minimally correlated	Yes, or name of other KRI that is similar

Table 7.8 The collected data of a KRI

Metric id	Date/timestamp	Data point
Name or identifier for the specific metric being measured	This is the date and timestamp the information is acquired.	This is the value of the data point. It is the numerical reference to the unit documented in data attributes.

Table 7.7 The data attributes of a KRI

Data attributes	
Attribute	Input
Unit	Count, currency, percentage, time, etc
Delivery	Automated or manual
Source type	Manual entry, spreadsheet, system of record
Source name	Name of spreadsheet or system of record; blank means manual entry
Cost-effective	Low (low cost), medium (medium cost), high (high cost), very high (very high cost); you can assign ranges to these as well
Steward	Name or employee id of data steward
Quality control process	Description of QC process
Historical availability date	Date of first available (reliable) data; blank indicates no historical data available
Retention period	Default or specified number of years

Table 7.9 The threshold log for a KRI

Threshold log		
Metric id **Name or identifier for the specific metric being measured**		
Date	Date of the status change	
Status	Initialised, changed, removed	
Rationale	Support for the status entry	
Trigger count	This is the number of triggers defined	
Triggers	There will be one trigger record up to the trigger count	
Trigger level This is a numerical entry and relates to the unit of the KRI being measured	**Severity** This is the relative severity of the trigger. A typical entry in this field is colour (eg, green, amber, red)	**Trigger action** This is the action taken when KRI data point exceeds this trigger level. It is reviewed during the monitoring process.

Table 7.10 The core data collected for a KRI with relationship to thresholds noted

Metric id	Date/timestamp	Data point	Trigger breach?
Name or identifier for the specific metric being measured	This is the date and timestamp the information is acquired.	This is the value of the data point. It is the numerical reference to the unit documented in data attributes.	Monitoring performs a check to determine whether a trigger was breached.

Source: Key Risk Indicators, Rodrigues, A. & Chadha, V., 17 Jan 2016