



## ANALYSIS-BASED MEASUREMENT

Mark Conostas discusses the work of the Resilience Measurement Technical Working Group to establish a theoretical and practical application of resilience measurement

In a recent white paper by the BCI 20/20 Think Tank (August 2015) 'The Resilience Challenge for the Business Continuity Profession', the ability for businesses to anticipate and respond to risks was identified as a strategy that protects against the kind of disturbances that can undermine business operations. It was noted that resilience "...enables organisations to increase adaptive capacity, maximise competitive advantage and become more agile to changes in the business environment."

Events such as the 2009 global economic crisis, and the interconnectedness of business operations at the global level that may cause the shocks to propagate, underscore the importance of resilience. While it is viewed in the business continuity community as a perspective that helps business cope with and adapt to shocks, the ability of resilience to gain traction is limited by the lack of measurement guidance. As Julia Allen noted in a BCM article, "...because resilience is difficult to measure, the business case for it simply isn't quite there yet." Measurement, for businesses and for other types of organisations, is useful because it provides a systematic way to connect decision making and strategy to data. The absence of well-developed measurement tools means that data and evidence will play a limited role in connecting these two areas.

Among individuals whose work is concerned with low income countries, it is now widely recognised that climate change, agro-ecological fragility, economic volatility, and related socio-political instability have produced a more varied, less predictable configuration of risks for the world's poor. Against the backdrop of a more complex risk landscape, the concept of resilience has captured the interest of varied groups of stakeholders concerned with how to ensure the welfare of vulnerable populations living in high poverty. A commitment to using the concept of resilience as a reference point for policy and programming is particularly strong when the welfare of those who live shock-prone contexts is considered.

Among communities whose work is focused on developing contexts, resilience is viewed as valuable because it is seen as providing a unified response to shocks resulting from catastrophic events and crises, and to the stressors associated with the ongoing exposure to risks that threaten well-being.

### In theory and in practice

As interest in resilience has increased and funding has grown, so too has the need for clear technical guidance on how to measure resilience. In recognition of this need, the Food Security Information Network established the Resilience Measurement Technical Working Group (RM-TWG).<sup>1</sup>

The overarching goal of the RM-TWG is to provide guidance on how the requirements of resilience measurement might be presented as a set of practices that have both theoretical merit and practical utility. Since its inception in June of 2013, the RM-TWG has prepared two comprehensive papers and produced an associated set of technical briefings on resilience measurement. The most recent paper, 'A Common Analytical Model for Resilience Measurement' (Conostas et al., 2014), outlined a strategy that provides the operational vehicle needed to move an interest in resilience from an abstract set of ideas to a measurable set of outcomes. Using the common analytical model as a point of reference, this article provides a condensed summary of the principles that may direct resilience measurement.

At the core of the measurement enterprise is a commitment to deep analysis and a desire to identify important cause-effect relationships. How one defines resilience as an object of measurement needs to be pursued with analytical rigour. The way in which resilience as the object measurement is situated in a larger constellation of related topics also must be analysed as part of measurement. How one specifies the connection between a definition of resilience and an actual set of observable indicators (i.e., operationalisation) needs to be analysed.

While not a required part of all measurement work, the need to map cause-effect relationships is important in those situations where one intends to measure the effect of some intervention, programme, strategy, or policy on an outcome of interest.

## The analytical core

Because the list of analytical actions associated with measurement is typically long and often full of complexity, it is useful to describe a discrete series of steps around which the process of developing measures may be structured.

Based on the work of the RM-TWG, a set of six analytical elements were described. These elements specify core tasks that should be pursued in order to develop resilience measurements. Figure 1 provides a schematic of how the six elements are organised and sequenced. While the analytical elements are the core feature of the figure, it is important to recognise that resilience measurement is based on a foundation of technical considerations as noted in the left hand side of the figure. Further description of each of these technical considerations is provided in the full paper on which this article is based.

The analytical elements can be posed as a set of questions that direct the process of developing resilient measurement tools:

### 1. Resilience measurement assumptions

– How is resilience defined? A decision must be made to establish whether resilience will be treated as an input or as an output. Additionally, the recognition of the different types of resilience (e.g., ability to absorb, adapt or transform) should be built into the definition. For either case, the kinds of inputs or outputs associated with the definition should also be stated.

### 2. Resilience causal framework

– How is resilience located in a chain of cause-effect relationships? The factors that affect the status of resilience, defined as an input or output, should be identified and the way in which those factors may potentially interact with each other should be stated.

### Foundations of Sound Measurement

- Construct validity
- Latent properties
- Operationalisation
- Multidimensionality
- Reliability standards
- Validity standards
- Utility standards

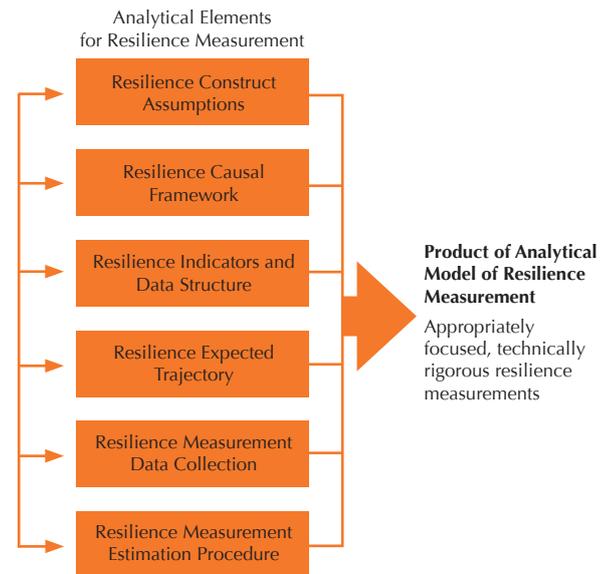


Figure 1: Analytical elements of resilience measurement

3. **Resilience indicators and data structure** – What set of indicators will be used as measures of resilience? Indicators which are used to represent a set of abstract concepts associated with resilience should be clearly identified and defined.
4. **Resilience expected trajectory** – What is the expected rate of change and time scale on which measurement data should be collected? The timing of measurements for resilience should not be arbitrary and should rather reflect an understanding of the length of time it takes for expected effects to appear.
5. **Resilience measurement data collection** – What selection of quantitative and qualitative data collection tools are required for resilience measurement and what procedures will be put in place to ensure that standardised procedures are employed? The complexity of resilience requires a balanced measurement approach, one that draws on the strengths of both quantitative and qualitative measurement tools.
6. **Resilience estimation procedures** – Once resilience data have been collected, how should those data be analysed to draw inferences and formulate warranted conclusions? The procedures that are used to extract meaning from measurement data should have the capacity to both illustrate simple relationships and reveal non-linear, complex relationships of resilience dynamics.

The way in which each of these questions is answered depends strongly on the purpose of measurement and the context in which resilience measurement data will be collected and applied. Regardless of the purpose and context, however, each of the questions must be answered if resilience measurement is to be carried out in a technically rigorous manner.



“While one may be interested in measuring how resilience can be observed at a particular level (e.g., an individual level or an organisation level), it is important to recognise cross-level interactions”

**Resilience causal framework**

Of the six listed analytical elements, the task of locating resilience in a framework of cause and effect relationships is perhaps the task that is at the centre of resilience measurement. Offered as a tool for identifying causal relationships that are important for resilience measurement, the *resilience causal framework* is presented in Figure 2.

The centre part of the model portrays resilience as comprised of three components that highlight opportunities for measurement. Arranged as a simplified chronological sequence, the resilience causal framework points out that resilience measurement is comprised of three components. The *ex-ante component* requires that one identify indicators to measure initial states of well-being and measures of the capacities that may or may not be in place to protect against shocks. The *disturbance component* requires measurement of the shock or stressors that threaten the well-being or condition measured as the initial state. The *ex-post component* looks at ways of measuring subsequent states and provides a point at which a measurement of well-being should be administered.

Whenever possible, it is important to take measures at multiple levels. Within this causal framework, resilience is defined as the ability of some entity (e.g., person, household, community, organisation) to maintain and/or improve on its well-being in the face of shocks and stressors. In simple quantitative terms, an individual, household or community may be called resilient if it is able to return to or improve upon its initial state following exposure to a shock.

Two additional points should be made. First, as highlighted on the far left of the causal framework, resilience measures may require that data be collected at multiple scales. While one may be interested in measuring how resilience can be observed at a particular level (e.g., an individual level or an organisation level), it is important to recognise cross-level interactions. Second, as highlighted

on the right-hand side of the framework, resilience measurement requires a selection of methods. Although measurement is often viewed as an objective enterprise driven by quantitative data; it is important to take advantage of the full range of measurement tools, including the judicious use of subjective measures and qualitative methods.

**The measurement challenge**

To design resilience measurement tools that are comprehensive and accurate, one must consider the full range of analytical tasks and map out critical causal pathways. The list of analytical tasks required for measurement involves heavy investment of labour and the articulation of a causal framework is not simple. If measurement depends on the completion of analytical tasks and the provision of a distinct comprehensive causal framework, one can begin to understand why required measures are often unavailable or simply not well developed. The acceptance of weak measurement, however, allows whim, style and ungrounded intuition to prevail over strategies that are based on evidence.

The view that resilience is a useful tool for planning can be supported best with data-based arguments. The ability to construct such arguments depends on the availability of sound measurement. In the absence of well-developed resilience measures, resilience will likely be viewed as an unsubstantiated fad or movement, one which may be easily replaced by the next fad. The challenge for those of us who believe resilience has value is to augment such belief with a concerted effort to develop sound measurement.

**(Endnotes)**

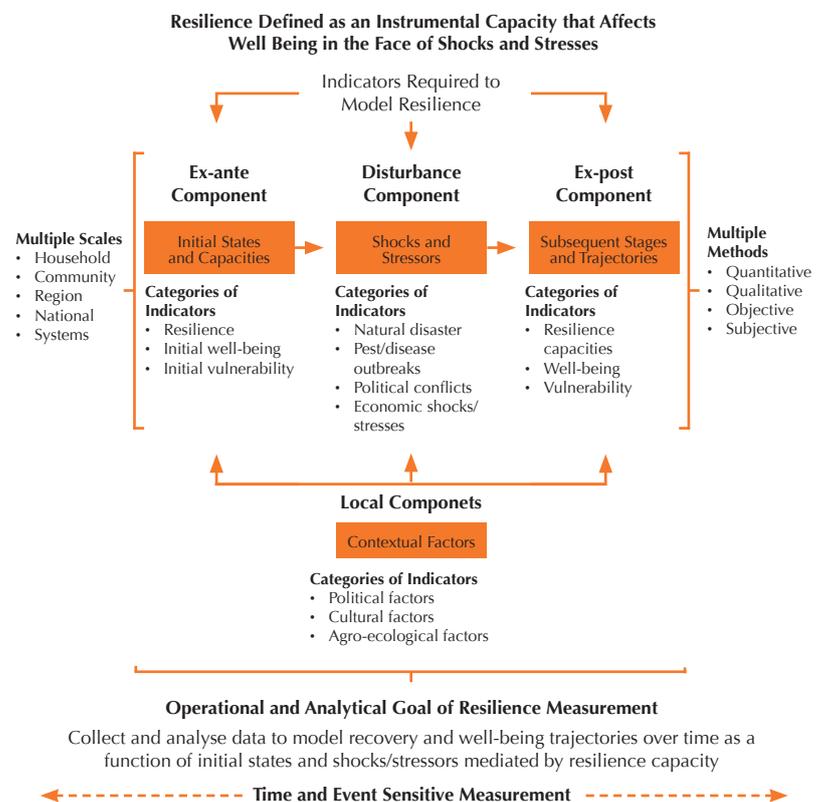
1 Further information on this working group, which is comprised of 20 individuals from government and non-government organizations, may be found at <http://www.fsincop.net/topics/resilience-measurement/en/>

Note: ‘A Common Analytical Model for Resilience Measurement – Causal Framework and methodological options’ is available for download at: [http://www.fsincop.net/fileadmin/user\\_upload/fsin/docs/resources/FSIN\\_Paper2\\_WEB\\_1dic%20\(WEB\).pdf](http://www.fsincop.net/fileadmin/user_upload/fsin/docs/resources/FSIN_Paper2_WEB_1dic%20(WEB).pdf)

**MARK A CONSTAS**

Mark A Conostas is associate professor of Applied Economics and Management and international professor of Agriculture and Life Science at Cornell University. He is also chair of the Resilience Measurement Technical Working Group, operating under the direction of the Food Security Information Network and jointly coordinated by the Food and Agriculture Organization of the United Nations, the International Food Policy Research Institute and the World Food Programme

Mark.Constas@cornell.edu



**Figure 2: Resilience Causal Framework: Components of resilience modelling**