

LOW PROBABILITY HIGH IMPACT RISKS AS A SOURCE OF SUCCESS: THE CHALLENGE OF RESILIENCE MANAGEMENT

Improving efficiency may prove to be a harmful strategy in a global environment that is full of sudden twists, surprises and shocks. In this situation decision makers have two alternative strategies; either invest in anticipation and thus be better prepared for changes – or surrender to uncertainty, and build success out of a risk environment. This requires a better understanding of resilience and new means for resilience management.

Advanced risk analysis and management methods are developed for risks that are recognized to be elementary for the success of the national economy or organizations. These methods are based on known unknowns, potential developments that we know well enough to assess the probability of the risk. When interdependencies are increasing, a larger number of risks are featured as fat tail risks, the probability of the risk is very low, or unknown, but the potential impact is high. In this paper, we focus on the management of risks, that we have very little understanding of, or that we cannot imagine: unknown unknowns. As an outcome, we will present a pragmatic way to measure generic resilience. The measurement framework will provide decision makers with a basis for resilience management.

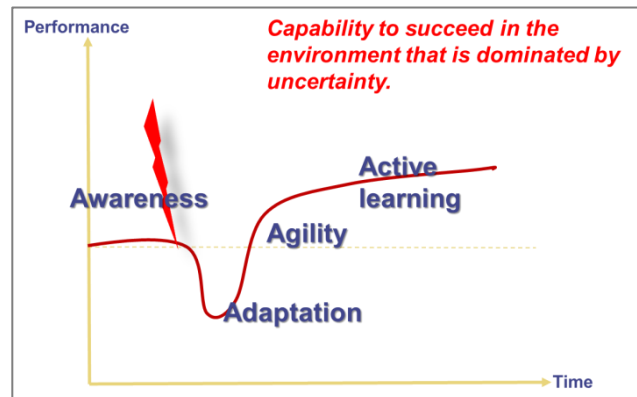
What do we mean by resilience?

The term is well recognized, but the challenge is to know what resilience means in everyday decision-making?

As seen above, resilience can be divided into two different types. The most common type is considered within a specific context (resilient against flooding or electricity outage, for example). We could develop a measurement system for a shock specific resilience, but it should then be customized for each of the shock contexts. We are studying low probability (no probability) uncertainties, including unknown unknowns. For us, the second type of resilience, generic resilience, is more interesting and explaining why some nations/organizations are resilient to most types of shocks. Our approach covers economy-driven extreme events (the European Monetary Union collapses), technology (the internet collapses), political surprises (the Crimea conflict and related trade wars), environmental shocks (tipping points of the climate change process) and social disruptions (company specific boycotts).

Resilience is a competence that enables an organization to succeed in an environment shaped by uncertainty and surprise. Four competencies form the core of resilience management:

1. **Awareness** of uncertainties. This is essential due to the fact that awareness leads to better long-term decision-making.
2. The capability for fast **Adaptation** after the shock occurs.
3. **Agility** to benefit from the changed situation in the global market arising from the shock.
4. **Active learning** using the shock experience as a source for learning and development.



In order to understand the phenomena of resilience, we have to be able to measure it. Our step-by-step process for measuring resilience is based on our empirical research and a proven theoretical framework.

What builds resilience?

One of the ways nations can improve their resilience is to build the right kind of asset portfolios. For example a portfolio of international alliances. If the alliance portfolio is sufficiently diversified, a sudden change in the global political situation (Krimian conflict) would not shake the national economy. When the shock damages one alliance (export to Russia), it may well benefit another (closer economic ties to US) and thus balance the total impact. From a resilience management perspective the challenge is; how to assess the resilience of a European country in 2013 so that the measure would provide an understanding on the current state of it's national resilience in 2014, when this kind of disruption was difficult or even impossible to anticipate?

In volatile global markets, the life cycle of opportunities seem to be shorter and shorter. In order to be agile in volatile environments, the national innovation system needs to be fast to react. A peculiar feature is that those national economies that have enjoyed relatively stable development are more vulnerable than those that have experienced problems and learned to manage. Is there a means to measure failure capability and its contribution to national resilience?

There is one key element that seems to be a prerequisite for adaptation: TRUST. Trust between citizens, between citizens and authorities and among authorities. When actors can trust that others are doing their best in an exceptional situation, everyone is able to improvise – and adapt. How to measure trust, in a way, that its impact on resilience is straight forward and clear?

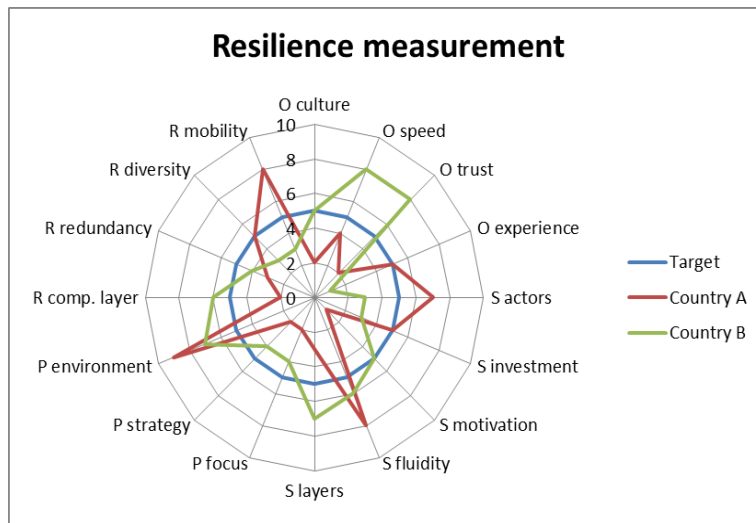
We do not claim to have answers to all of these questions, but we have now developed a system that analyzes the current generic capabilities, identifies the key vulnerabilities and indicates the potential – case specific – sources of resilience. The first proxy for a generic resilience measurement is ready.

How to measure resilience?

New planning, management and policy concepts are not implemented until they are operationalized, in a way, that decision makers can see the value of the development investment. This requires a way to assess current resilience, compare the resilience of a nation/organization with competitors and calculate the return on development investment. The development of the measure is a step-by-step process.

Empirical case studies allow us to divide our resilience measure into four dimensions: Operations resilience, Structure resilience, Strategic Perception (thinking) resilience and Resource resilience. Each of these four dimensions consists of a set of 3-5 factors. In order to illustrate our measurement system we will return to those challenging examples we described above.

First in our analysis of the national, regional and organization resilience the most evident feature of a system in all of the three levels of analysis was diversity. The more diversity built into operations,



structure, strategic thinking and resources, the more resilient the system is. The traditional alliance policy may increase security against military threats, but it will as well increase rigidity in the situation where the political situations are changing. Complexity of the global environment requires complexity (Ashby's law of requisite variety), thus the portfolio of political alliances should meet diversity requirements of the global political system. In the

political arena the implication of the Ashby's law is that we have to analyze the vulnerability of the integrated system of three subsystems: political, security and economic systems.

Structural diversity is measured by using very simple indicators of the topology of the integrated network and stress testing the system with a specific set of shocks (Seven Shocks methodology).

Second example, the speed of reaction to the changing environment requires an agile system, that is capable of fast reactions. According to our research, it seems that a prerequisite for speed of adaptation is "a short cut" structure build into the traditional planning process. In systems terms, shortcuts produce faster feedback loops.

Speed as a resilience competence is measured by assessing the "throughput time" that is needed from of the system to react to the change of the situation.

Our studies show that even if the source of disruption is caused by nature, the reactions of the social system define the actual impact. This is the basis of why trust within a social system is a key resource of resilience;

Trust is measured by analyzing the systems perception of the future. The analysis can be based on the media analysis and/or a semiotic survey.

The systematic management of resilience requires a platform that provides a reliable way to assess the need for resilience development policies and to calculate the return on the resilience investments. The GXN research team is now in a process of building one diagnostic tool that would integrate our existing analytical tools for operations, structure, strategic perception and resources analysis into one framework. Our ambition is to develop a standardized way to diagnose and measure resilience in the national, regional and organizational level.

The Global X-Network

The Global X-Network is a self-organized group of researchers and scientists from 10 countries. The multi-disciplinary network is dedicated to studying extreme events, uncertainty and resilience. The ambitious goal of the X-research team is to find a reliable theory-based way to measure resilience. In order to justify investments in adaptability and agility, we have to show how resilience improves when developed systematically. It is also essential to be able to compare the resilience of organizations and nations.

In order to distinguish the most essential features of resilience we have studied resilience at the global sector level (global forest industry), national economy level (Scotland, Finland, Korea), regional level (three regions within Finland, cities such as Tokyo and New York) and finally organizational level (four companies within different industries, top 5 global ITC companies).

Uncertainty is a challenging theme of research. In order to increase validity and reliability of our measurement framework, we apply multiple research methods as well. The studies reported here have used statistical analysis of the existing data, systems analysis tools such as Agent-Based Modeling, Network Topology, X-events, Robust Portfolio Modeling, Semiotics and participatory review processes (Delphi). In this white paper we do not describe the methods used, but focus instead on the results .

