



Measuring Sustainability Outcomes: Insights from the Resilience Dividend Framework

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Overview

- Why the interest in resilience?
 - The 100RC Project
 - Resilient city characteristics
- Where should councils invest?
 - CERD Framework for Regional Economic Development
- How can we measure sustainability?
 - Location quotients/Input Output analysis
 - Measuring the Resilience Dividend
- So what do we measure?
- The professional leadership challenge

Why the interest in resilience?

- Comes from the focus on recovery from disaster (see EMV)
- So responding to shocks!
- Sustainability is about living within one's means, on a community level of analysis.
- Communities can also be more or less resilient dealing with:
 - Immediate shocks (natural disasters), or
 - Shocks building over time (sea level rise)



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Natural disaster costs in Australia are projected to reach AUD39 billion per year by 2050. Swiss Re Australia & New Zealand Managing Director [Mark Senkevics](#) sets out the case for the [#publicsector](#) to transfer disaste ...see more



De-risking climate challenges

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Figure 3. Community resilience characteristics

Sustainability versus Resilience

- Sustainability = living within your means
- Resilience = the capacity to respond to immediate shocks and long term disruptions

Definition of the resilience dividend

‘the resilience dividend can be defined as the difference in the stream of net benefits to a society’s well-being between resilience projects and a counterfactual setting, which can be either a BAU case or a project that is not developed with a resilience lens’.

(source: Rand Corporation)

100RC Project

- The Rockefeller Foundation's 100 Resilient cities project:
 - 'dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century.'
 - '100RC supports the adoption and incorporation of a view of resilience that includes not just the shocks—earthquakes, fires, floods, etc.—but also the stresses that weaken the fabric of a city on a day to day or cyclical basis.'
- So more than simply the capacity to deal with natural disasters
- In Australia Melbourne is one of the 100 Resilient Cities

JUDITH RODIN

Being *Strong* in a World Where
Things Go *Wrong*

the
RESILIENCE
DIVIDEND

"In a world where disruption is a fact of life and uncertainty is permanent, Judith Rodin shows us ways of engineering a better and learning book, it how we can prepare for the unexpected and by doing so make our communities stronger, more prosperous and more resilient in the process." —PRESIDENT BILL CLINTON



Judith Rodin's 5 Characteristics of Resilience

- **Aware:** knowledge of strengths and assets, liabilities and vulnerabilities
- **Diverse:** different sources of capacity – redundant elements or assets to draw on
- **Integrated:** coordination of functions and actions across systems
- **Self-regulating:** can regulate itself in ways that enable it to deal with anomalous situations and disruptions
- **Adaptive:** the capacity to adjust to changing circumstances by developing new plans, taking new actions or modifying behaviour

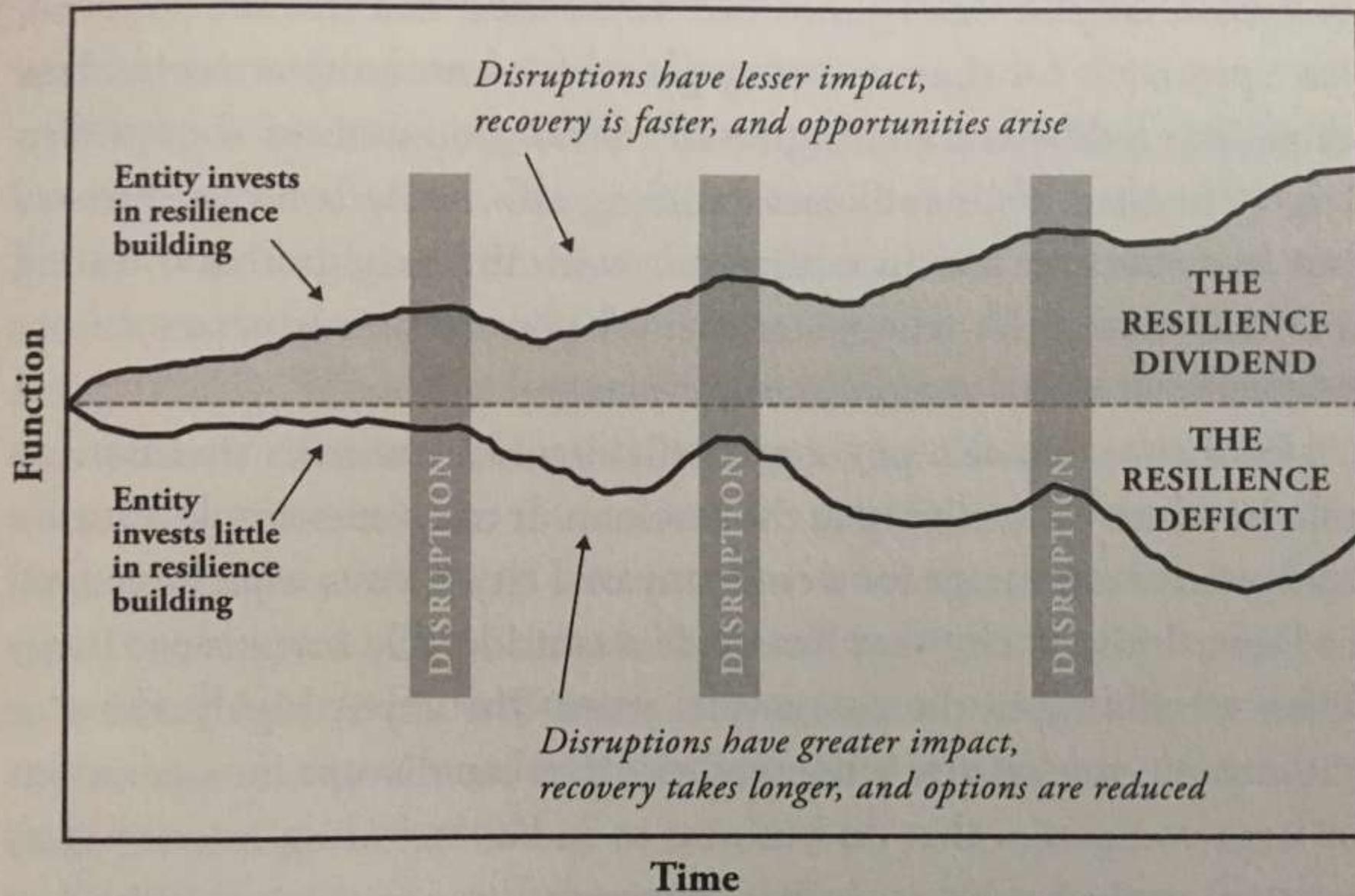


Figure C.1. The Resilience Dividend

Resilient cities have five characteristics

- The capacity for robust feedback loops that sense and allow new options to be introduced quickly as conditions change.
- The flexibility to change, and evolve, in the face of disaster.
- Option for limited or “safe” failure, which prevents stressors from rippling across systems—requiring islanding or de-networking at times.
- Spare capacity, which ensures that there is a backup or alternative when a vital component of a system fails.
- The ability for rapid rebound, to re-establish function quickly and avoid long-term disruptions.

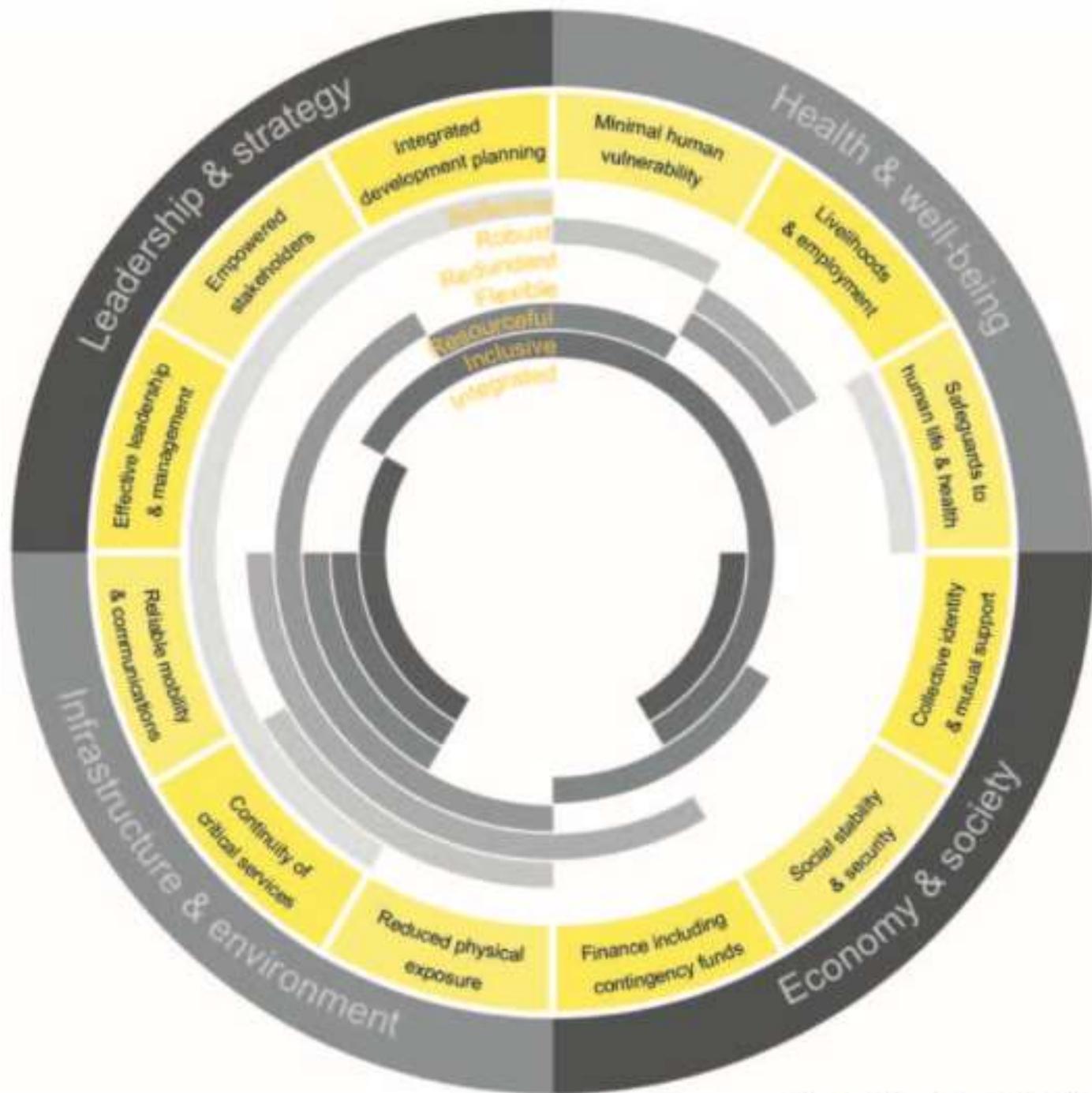
(source: The Rockefeller Foundation)

According to Arup Int Dev resilient systems possess seven main qualities

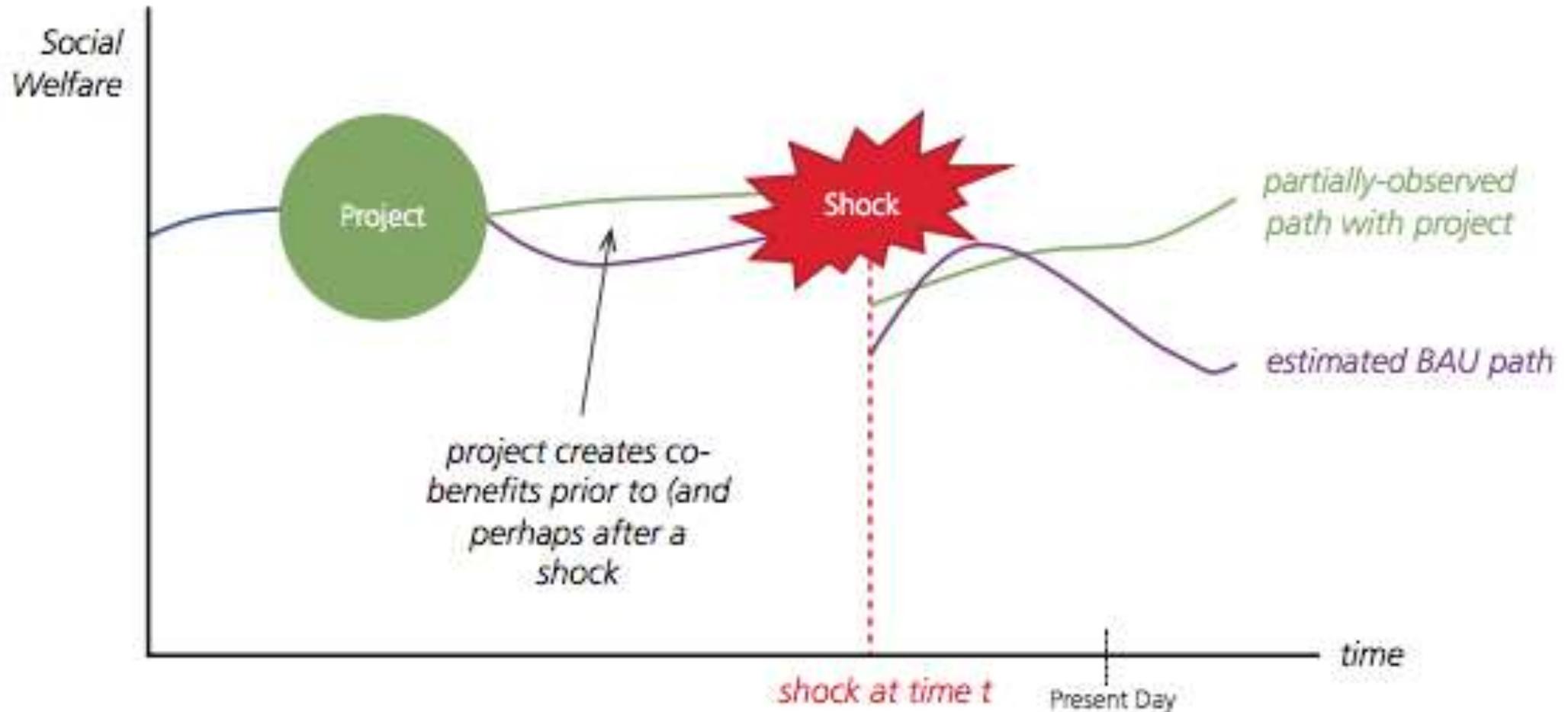
- Reflective: Mechanisms that continuously evolve
- Robust: Anticipation of potential failures, provisions to ensure failure is not disproportionate to cause
- Redundant: Spare capacity to accommodate disruption, pressure and change
- Flexible: System can change, evolve and adapt
- Resourceful: People and institutions are able to rapidly find different ways to achieve their goal
- Inclusive: Community engagement
- Integrated: Integration and alignment between systems to promote consistency

Community-level definitions of resilience

- **Absorption** capacity: *How large a disaster/stress can a community absorb/resist and still function in the pre-event mindset? Some authors have described this as resistance or absorption capacity.*
- **Adaptive** capacity: *How adaptive is the system to stresses while still maintaining function? This can be viewed as the redundancies within the system that enable the system to continue to function (although potentially at a reduced capacity), what has been called the adaptive capacity.*
- **Restorative** capacity: *How restorative is the system once productive capacity has been reduced? Specifically, how quickly can the system get back to “normal” functioning— understanding that “normal” may look different after the event than before it—labelled restorative capacity.*



Valuing a Project with Co-Benefits and a Single Shock



Challenges in Estimating the Resilience Dividend

We only observe one state of the world. We cannot, in retrospect, directly collect data about outcomes from a world in which that project was not implemented.

Dealing with the universe of potential shocks and stressors is challenging. With backward-looking ex post analysis, the natural thing to do is use the observed shock(s) to estimate well-being for the project and BAU cases given shocks that actually happened. This approach, while practical, may ignore relevant shocks in the future, which may be different from shocks experienced in the past.

Estimating the resilience dividend often requires considerable data. Calculating the resilience dividend requires that one understands the structure of complex, adaptive, and dynamic systems.

Establishing a causal relationship is difficult yet important. The resilience dividend is the difference in outcomes between a project that takes a resilience view and a counterfactual that does not. It is critically important that practitioners define and estimate an appropriate counterfactual, or BAU case, in order to quantify the resilience dividend.

So how might we do this?

Motivating the Resilience Dividend Valuation Model: Inclusive Wealth Theory

The RDVM is based on the theory of inclusive wealth:

‘Inclusive wealth theory values the capital stocks within a system, taking into account the manner in which goods and services are produced from the capital stocks and how society values those goods and services’

- Endogenous versus exogenous development challenges public policy

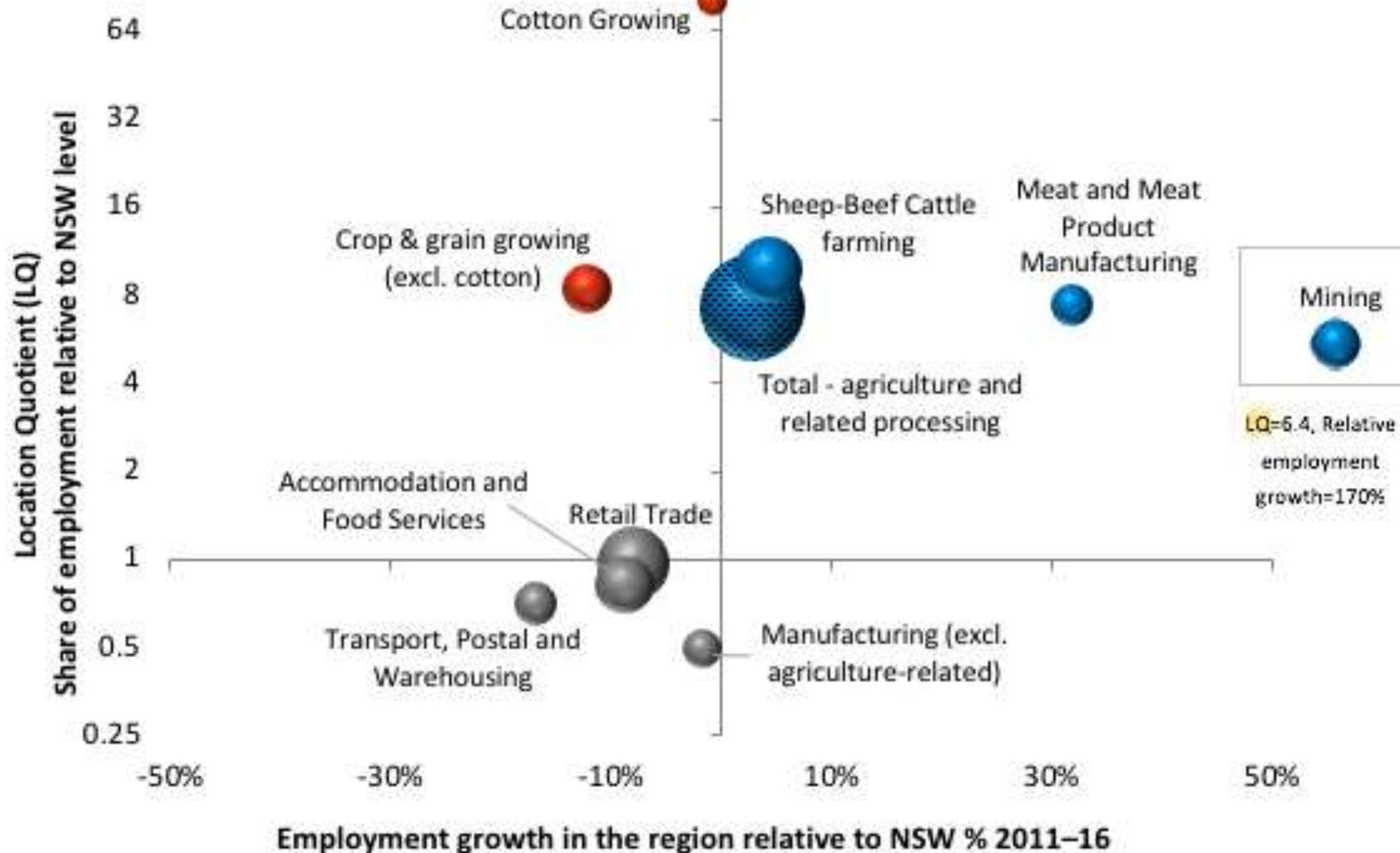
Where should councils invest?

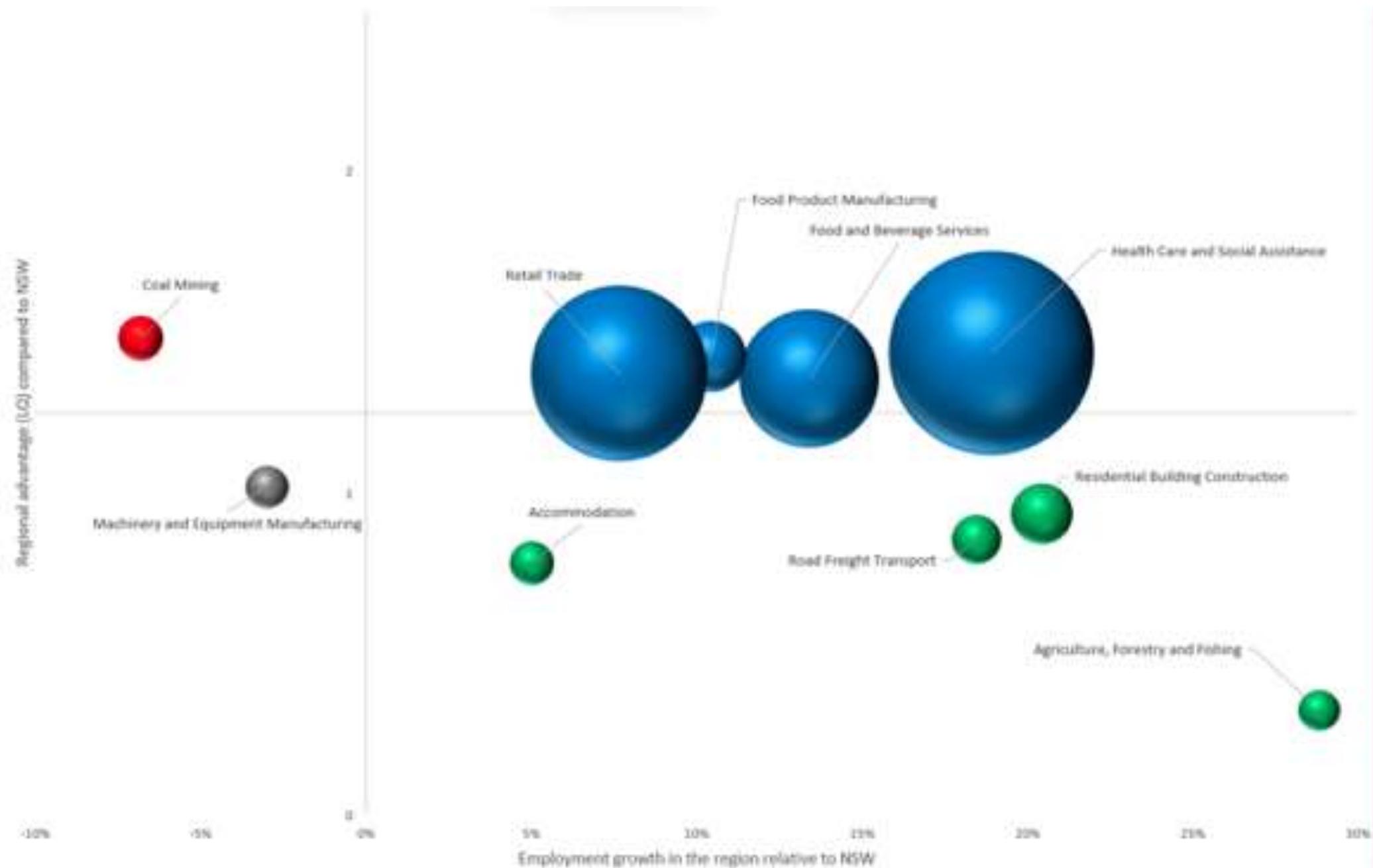
Endowments and specialisations

- What are the endowments in your locale/region/community?
- How are these endowments being utilised? Is it sustainable (agriculture)
- What does your locale/region specialise in?
- If you were to realise a 'resilience dividend' related to the provision of relevant infrastructure what would that be?
 - Road networks, transport hubs, rural bridges
- How can these investments contribute to local sustainability?
- What is the cost benefit analysis? Social investment?

CERD Framework for Regional Economic Development

- For the purposes of regional development, it is useful to classify industries as:
 - Engines — industries that bring money into the region (e.g. agriculture) and drive the local economy
 - Enabling — industries that support the engines (e.g. veterinary services to agriculture)
 - Population serving — industries that support the local population (e.g. retail).
- Typically, the fortunes of the population-serving industries depend on the success of the engines and therefore it is useful to focus on the engine sectors that drive growth.





Six steps to estimating the resilience dividend

- Define the intervention and BAU scenarios
- Map the system
- Define the shocks and/or stressors
- Map out the changes to the system in the intervention and BAU scenarios
- Estimate the intervention and BAU paths
- Aggregate the estimates of well-being.

So what do you measure?

- What are the engines of economic development in your locale/region?
- What are the enabling industries?
- What are the infrastructure needs of these two types of industries?
- What do the cost benefit analyses tell you about the best returns for specific infrastructure investment?
- If economic analysis is not your skills set how do you get assistance with this research?
- Where are the opportunities for synergistic investment/resilience dividend?

Skills Needed to Apply the Resilience Dividend Valuation Model

The RDVM is a complex approach based in economic and systems theory and requires high-level skills:

- Experience with formal program/project evaluation
- Experience with causal statistical inference
- Experience with simulation modelling
- Experience with benefit-cost analysis and other economic techniques
- Experience working with imperfect data

The professional leadership challenge

- The idea of a resilience dividend is embedded in project proposals
- Is it a concept that can be used in the organisation's policy making process?
- We have used the concept of redundancy to build in resilience
- These two ideas together can be used to achieve council's sustainability outcomes
- Our focus here is to start with an economic analysis
- Then to engage the community to learn about their views on outcomes and to inform them about resilience options

References

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