Systemic Socio-Economic Dilemmas in Regional Australia

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CONTEXT

This paper focuses on regional economic development in Australia, particularly in high dependency ratio local government areas (LGAs) faced with rapidly ageing populations, and challenges to achieve both improved prosperity and quality of life (wellbeing). While many of these topics have been canvassed in isolation, the motivation for this study is to bring together the key dynamical components of regional socio-economic systems (population, economy, community and environment) to create a cohesive long-term view, and provide a generic (yet customisable) simulation model (Winch and Arthur, 2002) with the capability to evaluate the impact of possible policy interventions across regional LGAs. The study used the Nambucca Valley on the NSW Mid North Coast as an exemplar to develop and test the simulation model and is at an advanced work-in-progress (WIP) stage.

PURPOSE

Regional Australia has 194 LGAs (pop. 3.2m) characterised by median ages of 45+ years (cf. 38.3 years Australia, ABS, 2023), creating potentially unsustainable dependency ratios, despite capital to region migration remaining 16% above pre-Covid levels (RAI, 2024), running against the historically dominant rural to urban migration trend. Many regional communities typically demonstrate economic underperformance, limited economic sector diversity and subpar wellbeing, as exemplified by Nambucca Valley's median age of 52.3 years, an over-reliance on construction and a wellbeing ranking of 358/516 LGAs (SGS, 2023). The challenge is to develop sustainable regional development policies (and a supporting decision tool) that address the complex interplay of population dynamics, economic resilience, and community wellbeing, that can be sustainable in the context of impending impacts of climate change (Woodruff et al 2018; NSW Government, 2024).

APPROACH

The study built on a causal loop diagram and logic generously shared by Bill Grace (Grace, 2024) designed to map generic socio-economic dynamics for regional communities, and tailored this to the Nambucca Valley, NSW context. Initial unstructured interviews were held with three local businesses and state government to complement the author's extensive local knowledge. Historical socio-economic census data 2006-2023 (Nambucca Valley Council, 2024) including sector level economic data was extensively analysed to understand the long-term evolution of the region and create the demographic and economic structure of the model. The causal loop diagram served as a blueprint to construct the system dynamics model overlay with changes projected to 2044, the timeframes being chosen to represent the reality of policy intervention funding and implementation timeframes. Supplementary community and environmental data were sourced from external surveys and research (SGS, 2023; NSW Government, 2024).

RESULTS

The initial findings presented here are pending the next stage design of possible policy interventions and are based on the substantial (c. 925 variables) simulation model built in Powersim. The attached causal loop diagram below reflects the depth of the simulation model.

The system's behaviour-over-time (BoT) analysis shows marginal, slow, below regional benchmark population growth heavily affected by domestic inbound migration, significant outbound migrant flows, and a rapidly ageing population, resulting workforce gaps, lack of economic diversity and inconsistency of economic output. The

exemplar LGA is ranked below benchmark on quality of life (wellbeing), although the natural environment and affordable housing are highlights.

The system's goals are not clearly defined, but rather implicit, as expressed by the local government's community strategic plan (Nambucca Valley Council, 2023) and system performance is below par against standard economic development system goals.

The dominant Reinforcing loop is population size and age composition, heavily influenced by domestic net migration (inbound and outbound) across LGA boundaries.

The notable Balancing loops are the ageing population, workforce availability, migration appeal, likely competitor response to migration promotion, and towards the end of the model horizon, increasing climate change impacts on key economic sectors (e.g. construction, agriculture and tourism) and wellbeing (Woodruff et al 2018; NSW Government, 2024).

CONCLUSIONS

This research draws on the application of system dynamics to studies of regional development, economic sectors and local small business (Bianchi, 2002; Winch and Arthur, 2002; Georgantzas, 2003; Samara et al, 2024; Vignieri and Grippi, 2024), and sits in the context of the application of system dynamics to economics issues (Radzicki, 1990; Forrester, 2003; Cavana et al, 2021), albeit in a regional and local institutional context (Saeed, 2014).

The complexity of forming a cohesive long-term view of how regional economies evolve has been broached, and a generic model platform created whereby a range of potentially sustainable interventions can be modelled to identify possible solutions and their impacts. This will likely have interest to state and local governments, economic development agencies, business and community associations, as well as researchers and System Dynamics practitioners.

There is potential to apply the model structure (with customised input data and parameters) to any regional Australian LGA, including resource-rich (typically mining) local economies (est. 110 LGAs mainly in WA and NT), where the population dynamics and age profile would require using different parameter values in essentially the same structure. (Winch and Arthur, 2002).

Finally, the development of a systems approach to economic development in Australia and further afield could be advanced by developing a gaming interface and management simulator protocol to develop strategic thinking capacity in the field (Winch and Arthur, 2002).

REFERENCES

Australian Bureau of Statistics (ABS), 2023. Census Median Age by LGA.

Bianchi C, 2002. Introducing SD modelling into planning and control systems to manage SMEs' growth: a learning-oriented perspective. System Dynamics Review 18 (3): 315–338. doi.org/10.1002/sdr.258

Cavana R, Dangerfield B, Pavlov O, Radzicki M, Wheat ID, Eds., 2021. Feedback Economics: Economic Modeling with System Dynamics. Springer: New York.

Forrester JW, 2003. Economic theory for the new millennium. Plenary address at the International System Dynamics Conference, New York.

Georgantzas N, 2003. Tourism dynamics: Cyprus' hotel value chain and profitability. System Dynamics Review 19 (3): 175–212. doi.org/10.1002/sdr.275

Grace W, 2024. Towards a conceptual model of regional development. Personal correspondence.

Nambucca Valley Council, 2023. Community Strategic Plan.

Nambucca Valley Council, 2024. Community and Economic Profile. Informed Decisions (id) census data analysis and estimates.

NSW Government, 2024. North Coast Climate Change Snapshot. NARCliM report.

Radzicki M, 1990. Methodologia oeconomiae et systematis dynamis. System Dynamics Review 6(2): 123-147.

RAI Regional Australia Institute, 2024. Regional Movers Index (June): 3-5.

Saeed K, 2014. Jay Forrester's operational approach to economics. System Dynamics Review 30(4): 233-261. doi.org10.1002/sdr.1525.

Samara E, Kilintzis P, Katsoras E, Martinidis G, Kosti P. 2024. A dynamic analysis to examine regional development in the context of a digitally enabled regional innovation system: the case of Western and Central Macedonia (Greece). Systems 12, 200. doi.org/10.3390/systems12060200.

SGS Economics & Planning, 2023. Cities & Regions Wellbeing Index.

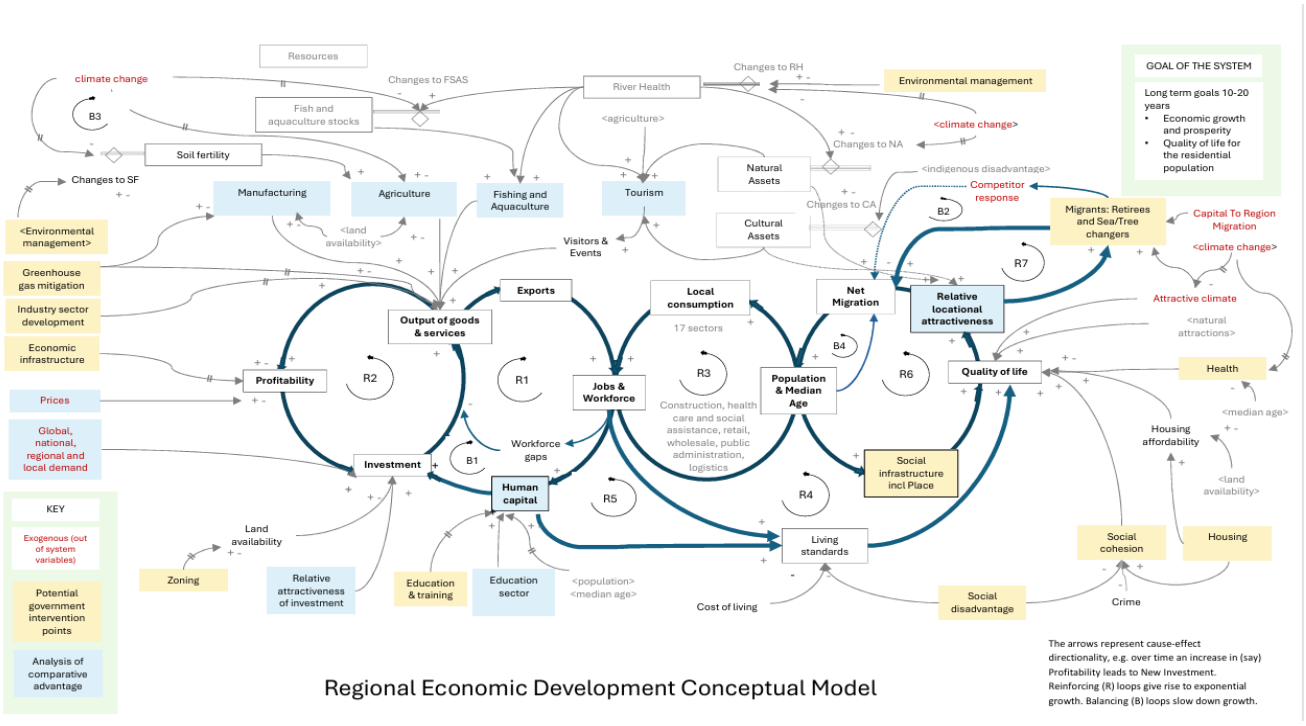
Vignieri V, Grippi N, 2024. Fostering the "performativity" of performance information use by decision-makers through dynamic performance management: evidence from action research in a local area. Systems 12, 115. doi.org/10.3390/systems12040115.

Winch G, Arthur D, 2002. User-parameterised generic models: a solution to the conundrum of modelling access for SMEs? System Dynamics Review 18(3): 339-357. doi.org/10.1002/sdr.252.

Woodruff S, BenDor T, Strong A, 2018. Fighting the inevitable: infrastructure investment and coastal community adaptation to sea level rise. System Dynamics Review 34(1-2): 48-77. doi.org/10.1002/sdr.1597.

KEYWORDS

economics, regional development, business, community, state and local government



Regional Economic Development Conceptual Model