Maturity modelling for transport systems thinking

→ Looking at the bigger picture when planning for decarbonisation in transport

→ Follow this QR code to take the maturity self-assessment quiz!

Executive summary

Environmental Sustainability already forms part of New Zealand's Transport Outcomes Framework, but effective decarbonisation requires close collaboration between transport decision makers and the decision makers in other areas of a wider system. We will describe a maturity model to assess how well transport projects, programmes, and organisations are placed.

There are 5 key determinants of this maturity model: outcome metrics, wider ecosystem, value-chain integration, technology, and people-centred design.

These must be broad enough to be equally applicable to all phases of transport intervention, and organisations with different levels of capability and capacity, meant initially as a self-assessment tool to highlight areas for development.

Outcome metrics

Until 2019/2020, benefit realisation reviews did not include environmental outcomes. Being new these outcomes may not be given appropriate weight and visibility among stakeholders. Modelling the bigger picture is especially important because typically the biggest environmental outcomes are caused by earlier phases in transport intervention. As outcomes can take a long time to register after the actions have taken place, intermediate proxies, perhaps enhanced by real-time and predictive reporting, are needed to guide decision making.

Level	Outcome metrics
5	Effective reporting on real-time & predictive metrics consistent along the phases of the intervention, with clear outcome owners.
4	Frequent reporting on relevant metrics that connect different intervention phases, visible to key stakeholders, and including leading, current, and lagging metrics.
3	Occasional reporting on metrics that have some relationship with outcomes. Some overlap in process stages.
2	Sparse metrics incompatible between intervention phases. Measured infrequently. Stakeholders not aligned on outcomes
1	Counter-productive metrics or no metrics defined. Outcomes poorly defined. No visibility by stakeholders

Wider ecosystem

Transport decisions have impacts on wider ecosystem areas like housing affordability, access to employment, injury rates, general health, and the environment. Conversely, other actors in this wider ecosystem have influence on transport decisions, such as councils and the media (on mode choice), developers and landowners (on route choice), overseas regulators (vehicle choice), and the police (accident rates and more). Transport exists in a wider interconnected ecosystem and any decisions should be made with an understanding of these interdependencies and a responsibility for the system-wide results. This requires two-way communication with system actors.

Level	Wider ecosystem
5	Close collaboration between actors in the wider system towards common, overarching goals and shared risk/investment
4	Bilateral collaboration between some system actors towards a common goal, but with discrete means
3	Awareness of other system actors and the interaction between them, with attempts at mitigating externalities
2	Limited awareness of link with other system actors without intention of addressing externalities
1	Lack of awareness of link with other system actors.

Value-chain integration

The phases of a transport intervention can be described as a value-chain: from planning to business case, design, procurement, construction, operation, maintenance, and end-of-life. Low understanding of downstream phases and poor planning can cause unintended consequences later, and information is often lost between phases in the hand-over process, like the original intent or prior knowledge for a decision. Therefore, good exchange of knowledge and including practitioners of downstream phases earlier in the project is most beneficial.

Level	Value-chain integration
5	Clear understanding and seamless collaboration along the full value-chain to an agreed vision.
4	Agreement on an overarching vision, with close collaboration between adjacent value-chain actors
3	Understanding of adjacent value-chain actors and their drivers, along with good information exchange.
2	Limited understanding of adjacent value-chain actors.
1	Competition or conflict between adjacent value-chain actors.

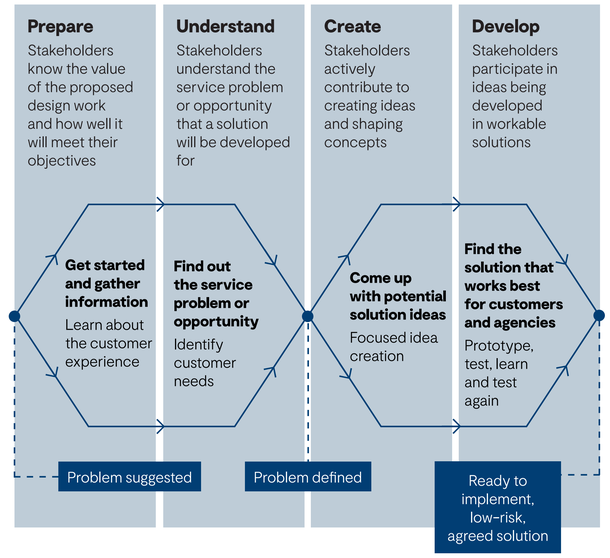
Technology

New Zealand's national transport technology systems are rapidly ageing, with mounting technology debt and risk of failure. More can be done to consider technology options alongside traditional interventions. Technology should aim to be interoperable, secure, and underpinned by privacy and open data principles – considerations which are outside the traditional strengths of transport professionals. An explicitly stated risk appetite contributes to determining the level of technological maturity, as trusting new technology requires risk.

Level	Technology
5	Judicious use of interoperable technology of the right maturity, underpinned by sound privacy / security / open data principles
4	Effective technology deployed, but fragmented, and not always underpinned by sound principles
3	Technology-for-technology's sake, often at wrong stage of maturity. Duplication and incompatibility common
2	Mounting technology debt from outdated systems, increasingly costly upkeep.
1	Lack of- or failing- technology. Frequent outages, highly inefficient operation.

People-centred design

Ultimately, the transport system is being operated for and by people. Using a people-centred design may offer solutions within the other determinants. People-centred design is defined by simplifying complex system dynamics through the lens of individuals affected, iteratively developing the problem definition, harnessing diversity of thought, and iteratively prototyping and testing solutions before implementing them. An example is the DIA service design framework, currently being used for Waka Kotahi's Innovating Streets for People programme:



Level	People-centred design
5	Intervention designed with affected communities using native collaboration frameworks and deep empathy
4	Use of design thinking / service design tools for engaging with the community
3	Affected communities genuinely consulted before making decisions
2	Consultation after the fact or not representative of affected communities
1	No consultation or ineffective communication

Conclusion

Significant advances in the decarbonisation of transport and other transport outcomes are possible. We hope that the key determinants and maturity levels described here service as a useful contribution to the discourse in transport intervention.

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