

The economic contribution of standards to New Zealand

NZIER report to Standards New Zealand

August 2025

About NZIER

New Zealand Institute of Economic Research (NZIER) is an independent, not-for-profit economic consultancy that has been informing and encouraging debate on issues affecting Aotearoa New Zealand, for more than 65 years.

Our core values of independence and promoting better outcomes for all New Zealanders are the driving force behind why we exist and how we work today. We aim to help our clients and members make better business and policy decisions and provide valuable insights and leadership on important public issues affecting our future.

We are unique in that we reinvest our returns into public good research for the betterment of Aotearoa New Zealand.

Our expert team is based in Auckland and Wellington and operates across all sectors of the New Zealand economy. They combine their sector knowledge with the application of robust economic logic, models and data and understanding of the linkages between government and business to help our clients and tackle complex issues.

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Key points

Standards are formally established and accepted norms, criteria or specifications

All standards are designed to meet a market and help establish trust between market participants. Standards are developed by statutory and authorised specialist bodies to ensure consistency, safety, quality, and interoperability across products, services, processes, or systems.

As New Zealand's official standards body, Standards New Zealand leads the development of standards and standards-based solutions. Standards New Zealand participates in and represents New Zealand's interests in international standardisation systems and related matters, and provides domestic access to standards.

The value that standards generate for the economy is not well understood

Fit-for-purpose standards are pro-growth. Standards are integral to productivity, innovation, and trade, but their economic value is often overlooked. A world without standards acts as a drag on economic performance. Standards are associated with around 9 percent of the total growth in exports (Vennerød et al. 2023). This will become increasingly important as New Zealand further integrates with the world.¹

Many standards trigger behaviours in the economy that can causally affect economic growth. For example, virtually every commercial transaction inherently involves an element of trust, particularly any transaction conducted over a period of time. Low levels of trust can increase transaction costs, resulting in significant economic inefficiencies. Standards help build this trust and assurance through alignment with best practice, demonstrating product quality and rigour.

This report demonstrates how standards contribute to productivity, innovation, and well-being in New Zealand. It also examines how the broader standards system can be strengthened to achieve greater impact. To assess value, we instead assess standards at the margin. We utilise a 1 percent increase in the stock of standards, as informed by literature, as it is a more practical, quantifiable, and policy-relevant approach to focus on marginal or incremental impacts. This is because the total value of the standards system and standards in New Zealand is undefinable, due to its large scale, and all-encompassing nature, and interlinkages with the entire economy.

The established literature focuses on the relationship between standards and productivity

Drawing on international research and applying the long-term average impact of fit-for-purpose standards, **we find that improvements in productivity from a 1 percent increase in the stock of standards could lift New Zealand's GDP by approximately NZ\$1.1 billion.** These gains are achieved through:

- enhanced labour and capital productivity

¹ To understand how valuable standards are to the New Zealand economy to export our products have to meet international and local standards. Globalisation is enhancing the value of recognised standards.



- greater innovation diffusion
- improved operational efficiency across industries.

This report’s findings support the case for more strategic investment in standards development and governance in New Zealand. Table 1 provides information on the value of increasing stock of standards, the split of growth attributable to government, and the percentage of standards that have non-market benefits.

Table 1 Summary results

| Findings | Total factor productivity estimate |
|---|---|
| Value of increasing stock of standards | \$1.1 billion |
| Split of growth attributable to government | 20% public vs 80% private sectors |
| Percentage of standards that have non-market benefits | 82% of assessed standards have some non-market benefits |

Note: We used an economy-wide model to assess a range of impacts, using two types of productivity improvements associated with a marginal increase in the stock of standards. The range used can be seen in section 3.

Source: NZIER

Standards contribute to both market and non-market outcomes

Eighty-two percent of the standards assessed have some form of non-market benefits. This highlights the additional potential value of non-monetised benefits. Areas where standards contribute to the economic and social wellbeing include:

- **Enhanced health and safety** – standards set minimum requirements that protect the public from harm across various sectors, including construction, manufacturing, energy, and public utilities.
- **Consumer confidence and protection** – by ensuring product and service quality, standards improve consumer trust.
- **Improved accessibility and social inclusion** – standards facilitate access for disabled people by mandating inclusive design in buildings and public infrastructure, supporting a more equitable society.
- **Environmental sustainability** – environmental standards, including those addressing emissions and land use, promote sustainable practices that contribute to long-term ecological well-being and climate resilience.
- **Community wellbeing and public good** – some standards, while technical in nature, indirectly support public safety and social cohesion, where benefits may accrue more broadly to society rather than to individual users.

Greater investment in the standards system would help New Zealand to get more out of the system by addressing key constraints

Standards New Zealand operates on a full user-pays, cost-recovery model that relies on voluntary contributions from both public and private stakeholders. Our engagement with stakeholders identified views that the current structure has led to a very reactive and narrowly scoped standards system, not proactive or strategically targeting specific sectors

to be a strong economic enabler. While this promotes sectoral ownership, it constrains participation from less-resourced stakeholders and limits the ability to update or align standards with emerging needs.

Stakeholder interviews highlighted issues such as outdated standards and regulatory citations, barriers to international engagement, and inconsistent compliance. These challenges reduce the system's responsiveness and inclusivity, particularly in sectors where public interest is high but commercial incentives are weak.

International comparisons with Singapore and Australia show alternative models that incorporate public funding, formal benefit assessments, and systematic post-implementation reviews. These approaches provide transparency, ensure standards remain relevant and current, and support broader policy goals. New Zealand can draw on these lessons to design a more robust and equitable standards system. One that balances public and private benefits and is better aligned with national productivity and well-being objectives.

Caveats

When assessing the value of standards, there is limited evidence on the individual impacts of specific standards or sectors. Instead, this report focuses on the total stock of standards, which allows us to capture broader network effects that are often missed in one-by-one evaluations.

We, therefore, treat new fit for purpose standards as broadly homogenous contributions to productivity growth, reflecting their collective influence rather than isolated impacts. Although we lack information on the cost of increasing the total stock of standards by 1 percent, we deem it reasonable to extrapolate that even a modest increase in Standards New Zealand's operating revenue, if directed toward the development of well-designed and effectively implemented standards, could yield positive returns to public investment.



Glossary of key terms

Table 2 Definitions of key terms used in this report

| Key term | Definition |
|--------------------------------------|--|
| Standards | <p>Standards are formally established criteria, specifications, or benchmarks that define acceptable levels of quality, safety, performance, or behaviour within a given context.</p> <p>In New Zealand, standards are set by Standards NZ and aim to guide production, service delivery, consumer protection, environmental practices, or regulatory compliance.</p> |
| Public and private goods | <p>A private good has the property that people can be excluded from its benefits at low cost, and its use by one person detracts from its use by another.</p> <p>A public good has the property that excluding people from its benefits is either difficult or costly, and its use by one person does not detract from its use by another.</p> |
| Public and private impacts | <p>Private impacts refer to the internalised costs and benefits that accrue directly to individual agents (consumers, firms, or households) as a result of their decisions or policy changes. These are reflected in market prices, utility, and profit functions.</p> <p>Public impacts refer to the externalities or spillover effects of an activity, policy, or investment that are not captured in market transactions and affect third parties or society at large.</p> |
| Market and non-market impacts | <p>Market impacts are changes that are fully captured through monetised transactions and therefore reflected in observed market prices and quantities. They modify the behaviour or welfare of agents <i>within</i> the price-based exchange system.</p> <p>Non-market impacts are changes in welfare that do not pass through market transactions. They concern goods or services that are not sold at economically significant prices, or external effects on third parties that remain unpriced.</p> |
| Externalities | <p>Externalities are the effects of an economic activity experienced by individuals or groups not directly involved in the transaction.</p> <p>Positive externalities occur when the activity provides unpriced benefits to others (e.g. improved public health from widespread vaccination)</p> <p>Negative externalities occur when unpriced costs are imposed on others (e.g. pollution from industrial production). These effects lie outside the market mechanism, leading to a divergence between private and social outcomes.</p> |
| Compliance costs | <p>Compliance costs refer to the resources expended by individuals, firms, or organisations to adhere to regulatory or administrative requirements. These may include time and money spent on gathering data, maintaining documentation, submitting reports, or undergoing audits.</p> |
| CGE modelling | <p>Computable General Equilibrium (CGE) modelling is an economic modelling framework that captures the interrelationships between different sectors, agents, and markets within an economy. The NZIER TERM-CGE model is used for this study.</p> |

| Key term | Definition |
|------------------------------------|--|
| Output | <p>Output refers to the total quantity of goods and services produced within an economy, sector, industry, or firm over a given period. It is a core indicator of productive activity and is typically measured in either physical units or monetary terms. Key distinctions include:</p> <ul style="list-style-type: none"> • Gross Output: the total value of all goods and services produced, including intermediate inputs. It reflects overall production activity before deducting input costs. • Value Added: the difference between gross output and intermediate consumption; this measure avoids double-counting and forms the basis for calculating GDP. • Real vs Nominal Output: real output is adjusted for price changes (inflation), allowing analysis of changes in physical production levels, while nominal output reflects current market prices. |
| Productivity | <p>Productivity is an economic measure of how efficiently inputs, such as labour, capital, and intermediate goods, are used to produce outputs in the form of goods and services. It reflects the capacity of an economy, sector, or firm to generate output relative to the quantity of inputs employed.</p> <p>Key forms of productivity include:</p> <ul style="list-style-type: none"> • Labour Productivity (LP): output per unit of labour input, typically measured as GDP or value added per hour worked or per worker. • Capital Productivity: output per unit of capital input. • Total Factor Productivity (TFP): the portion of output not explained by the quantity of inputs used in production. TFP captures the effects of technological progress, efficiency gains, economies of scale, and improvements in management or institutional quality. |
| Marginal costs and benefits | <p>Marginal costs and benefits represent the incremental change in total cost or total benefit resulting from producing or consuming one additional unit of a good or service.</p> <p>In the short run, marginal cost calculations typically exclude fixed inputs (such as capital), focusing only on variable inputs. In the long run, all inputs are considered variable, and marginal cost reflects the full resource cost of expanded production. These concepts are fundamental to assessing optimal resource allocation and efficiency.</p> |

Source: NZIER



Contents

- 1 Introduction1
 - 1.1 Why is this important?.....1
 - 1.2 To illustrate the value of standards, we have used a mixed methods approach2
 - 1.3 How do we value standards?.....2
 - 1.4 Challenges of measuring the total value of standards3
 - 1.5 What a world without standards would look like.....3
- 2 How standards impact the economy4
 - 2.1 Literature review4
 - 2.2 Insights from stakeholders7
- 3 Modelling the economic impacts.....11
 - 3.1 Why do we use a CGE model?11
 - 3.2 How we use the model11
 - 3.3 Design philosophy.....11
 - 3.4 Assumptions.....12
 - 3.5 Summary results12
 - 3.6 How are the impacts distributed across the economy?13
 - 3.7 Time frame of analysis14
 - 3.8 Caveats and limitations.....14
 - 3.9 How do these estimates compare to other measures of the New Zealand economy15
 - 3.10 Additional results.....16
- 4 Market and non-market impacts of standards17
 - 4.2 How standards contribute to wellbeing using the Treasury Living Standards Framework.....20
 - 4.3 Assessment of the market and non-market impacts of standards21
- 5 Discussion and recommendations26
 - 5.1 Research summary.....26
 - 5.2 Demonstrating the value of standards and the standards system.....26
 - 5.3 Future research opportunities and information gaps27
 - 5.4 Concluding comments27
- 6 References.....28

Appendices

- Appendix A The standards system 31
- Appendix B CGE modelling 42

Figures

- Figure 1 The Treasury’s Living Standards Framework.....20
- Figure 2 Standards NZ available standards33
- Figure 3 Standards by publication year33
- Figure 4 Standards offered by sector35
- Figure 5 Access events by industry sector.....36

Figure 6 New Zealand standards development process37
 Figure 7 Our CGE model represents the circular flows in the economy43

Tables

Table 1 Summary results ii
 Table 2 Definitions of key terms used in this report iv
 Table 3 Productivity estimates from a 1 percent increase in the stock of standards5
 Table 4 Total effects of regulatory capture and information asymmetry on innovation costs7
 Table 5 Economic impacts of a 1 percent increase in standards13
 Table 6 GDP contribution of standards over time.....16
 Table 7 Economic impacts of a 1 percent increase in standards16
 Table 8 Number and percentage of standards that contribute to market and non-market impacts....19
 Table 9 Market and non-market impacts of standards.....21
 Table 10 Standards Australia summary and demonstration of net benefit criteria40

1 Introduction

Standards New Zealand (SNZ) commissioned NZIER to assess the economic value of standards and the operations of the standards system to the New Zealand economy. This assessment aims to explore how standards contribute to the productivity, innovation, and well-being of New Zealand's economy and society. We also discuss how supporting systems can be strengthened for greater impact.

SNZ intends to use this work to support the Ministry of Business, Innovation & Employment's (MBIE's) current policy efforts to identify a sustainable and fit-for-purpose funding model for SNZ and the wider standardisation system.

The research will quantify and describe the economic and broader national benefits of New Zealand Standards as well as the value of the national standards body's services and functions. It will also identify who benefits from standards, distinguish between the split between households/businesses and government, and explore other relevant aspects of Standards New Zealand's work.

1.1 Why is this important?

Fit for purpose standards underpin much of the modern economy, setting technical, quality, safety, and interoperability benchmarks across various industries. By offering a common language and framework, they also build trust among firms, regulators, and consumers – underpinning confidence that components will fit, data will align, and products will perform as claimed. That trust, in turn, creates a gentle tailwind of innovation, lowering transaction costs and encouraging firms to experiment, collaborate, and invest.

Yet their economic contribution is often under-recognised or difficult to quantify because standards exert a pervasive, system-wide influence. Without clear evidence of their value, it is harder to make informed investment decisions about maintaining and updating the standards infrastructure.

Understanding, quantifying, and, where possible, monetising the benefits of standards is therefore critical. Robust evidence ensures that investment in the standards system is both justified and strategically targeted, ultimately delivering broad benefits to New Zealand's economy, society, and environment.

We know that standards are important and provide benefits to society over and above market benefits because:

- the different funding arrangements in Australia and Singapore reflect the broader benefits of standards
- the survey of the construction sector, as a heavy user of standards, highlights some of the non-market impacts, such as health and safety (see section 4.3)
- the impacts of standards are nuanced – Standards New Zealand has provided estimates of the market vs non-market impact of standards, as shown in section 4.1.

Assessing the impact of any single standard in isolation is inherently problematic as standards function as interlocking parts of a broader, mutually reinforcing system. When we evaluate the framework as a whole, we capture network effects (cumulative efficiencies, risk mitigation benefits, and trust spillovers) that are not apparent in one-by-one reviews. Although case studies focusing on an individual standard can illuminate specific mechanisms, they can often miss the systemic value created by the portfolio of standards acting together.

1.2 To illustrate the value of standards, we have used a mixed methods approach

This analysis aims to provide a foundation for future, more detailed work, including targeted investigations into sector-specific impacts, return-on-investment assessments for specific standards, and strategies for reforming standards development and funding processes.

To address our research objectives, we drew on:

- international and domestic literature examining the impacts of standards on productivity and innovation
- interviews with stakeholders involved in the development, use, or governance of standards in New Zealand
- computable general equilibrium (CGE) modelling approaches to estimate the macroeconomic impacts of changes in the stock of standards
- examinations of market and non-market benefits.

While the report provides indicative estimates, several uncertainties exist, particularly relating to data gaps, limited post-implementation evaluation, and the challenge of valuing system-wide or non-market benefits. As such, the depth of analysis reflects the preliminary nature of this scoping exercise and aligns with good practice in early-stage economic evaluations (NZIER, n.d.; Policy Project 2025)

1.3 How do we value standards?

To value the economic impacts standards have in New Zealand, we utilised the approach recommended by the ISO (2022). The three general techniques used for assessing the economic impact of any project or policy (including standards) are:

- regression analysis
- multiplier modelling
- CGE modelling.

We reviewed the literature that estimates changes in productivity via regression analysis and then applied the findings within our CGE model. Our CGE model is based on Stats NZ's input-output tables, which show the structure of New Zealand's economy as of the year ending March 2020. Changes in the economy, as a result, represent a 1 percent increase in the stock of standards compared to what was available in 2020 at that point in time. We select the lowest and highest impact for each of the productivity functions assessed, and then determine which is the most appropriate.



1.4 Challenges of measuring the total value of standards

Measuring the total value of standards to an economy is conceptually appealing but methodologically complex. Standards, ranging from technical regulations and product specifications to safety protocols and interoperability norms, underpin vast areas of economic activity. This poses several challenges to quantifying their full, baseline contribution:

- Standards have wide and interlinking impacts that cannot easily be attributed
- Standards have both market and non-market benefits that are often not reflected in market prices. Examples include reduced transaction costs, increased interoperability between businesses, the value of trust and public health and safety values
- There are large data limitations across the breadth of benefits generated
- There is little information as to what a world would look like without standards.

A more practical and policy-relevant approach is to focus on marginal or incremental impacts. For instance, modelling the effect of productivity improvements related to a marginal 1 percent increase in the stock of standards on national gross domestic product (GDP) or employment provides a clearer and more credible sense of the sector's contribution. This also avoids unrealistic counterfactuals while highlighting the economy's sensitivity to changes in the sector without overstating its absolute value.

1.5 What a world without standards would look like

What counterfactual is assessed is vital for any analysis. It is unrealistic to calculate the impact of standards by simply removing them from the economy and society and seeing how much economic well-being disappears, even as a thought experiment.

In reality, we would expect standards to be imported or some domestic reaction to the loss of SNZ. These approaches would be partial, and it is very unlikely that standards focused on the public good or the work done to support standards development internationally, as well as the support for trade agreements, would be comprehensive.

When modelling the economic value of a large, integrated part of the New Zealand economy, such as the application of standards, the scale of the numbers generated can quickly become implausible or unhelpful, especially when based on arguable assumptions. For example, estimating the value of standards by hypothetically removing them from the economy and replacing them with an alternative will produce extremely large estimates, but it also introduces a high degree of uncertainty.

These estimates depend heavily on assumptions about what standards might exist (possibly international standards of some description, their relevance to the New Zealand market, or standards generated privately). The assumptions would be open to question, and the impacts would vary. The feasibility of such an approach would be challenging to communicate to stakeholders, if not impossible. This defeats the purpose of developing a realistic view of the value of standards in the New Zealand economy and their importance. These challenges are also further amplified by the lack of available data and international research measuring the total value of standards.



2 How standards impact the economy

We model a range of scenarios that capture the potential economic impacts using a set of scenarios as they help address uncertainty and help illustrate the range of potential impacts.

2.1 Literature review

The international literature on estimating the economic impacts of standards focuses on two general areas. This includes:

- Economy-wide impacts associated with increasing the stock of standards – these studies focus on determining the correlation between the stock of standards and measures of economic growth. Economy-wide impacts of increases in the stock of standards are then estimated using whole-of-economy models.
- Sector-specific impacts of the introduction of standards – these studies focus on revenues increased or costs saved to various parts of the economy, like businesses and the public sector.

2.1.1 Economy-wide economic impacts

While these studies cover different countries and time periods, they all show a positive link between standards and productivity, illustrating the average long-term elasticity. Taken together, they offer valuable insights into the potential benefits of standards for New Zealand. We also include findings from a New Zealand-based study as a reference point for our estimates.

Table 3 summarises findings from various studies compiled by the International Organization for Standardization (ISO) showing how a 1 percent increase in the stock of standards can affect productivity (ISO 2022).² The literature measures the net change in the stock of standards as the difference between new and withdrawn standards. Some of these studies measure TFP, while others focus on LP.

TFP is the portion of output not explained by the amount of inputs used in production. As such, its level is determined by how efficiently and intensely the inputs are utilised in production. Whereas LP only looks at the productivity associated with labour inputs, usually as output ‘per hour’ or ‘per worker.’

² These dates reflect the length of the time observed where standards could increase several percent a year. For example the net stock of standards in the Nordic countries grew by an annual rate of 1.2 percent on average over the last 10 years (Menon Economics et al. 2018). Over the 1981 to 2004 time period in Canada the number of standards rose 0.69 per cent on average per year (Haimowitz and Warren 2007).

These measures are important as they show that the contribution and importance of productivity increases are essential for sustained income growth. Policies with positive productivity impacts contribute to growth overtime, not just at a single point. As a result, when assessing the value of a policy or investment, its effect on productivity gives insight into its potential to raise living standards over time.

While these studies cover different countries and time periods, they all show a positive link between standards and productivity, illustrating the average long-term elasticity. Taken together, they offer valuable insights into the potential benefits of standards for New Zealand. We also include findings from a New Zealand-based study as a reference point for our estimates.

Table 3 Productivity estimates from a 1 percent increase in the stock of standards

| Country | Publication year | Period of analysis | Change in productivity (percent) |
|------------------|------------------|--------------------|----------------------------------|
| Australia | 2006 | 1962-2003 | 0.12-0.17 (TFP) |
| Canada | 2007 | 1981-2004 | 0.356 (LP) |
| France | 2009 | 1950-2007 | 0.12 (TFP) |
| New Zealand | 2011 | 1978-2009 | 0.10 (TFP) |
| United Kingdom | 2005 | 1948-2002 | 0.05 (LP) |
| United Kingdom | 2015 | 1921-2013 | 0.106 (LP) |
| Canada | 2021 | 1981-2019 | 0.056 (LP) |
| Nordic Countries | 2016 | 1976-2016 | 0.105 (LP) |
| South Africa | 2016 | 1972-2011 | 0.07 (LP) |

Source: ISO 2021

The benefits associated with standards from the literature state that standards (Cebr 2015; Haimowitz and Warren 2007):

- help businesses to enhance the quality of their products and make their processes more efficient
- efficiently reduce the variety of goods and services to an optimal level for minimising cost by facilitating interoperability of products and processes
- make technical information available to all firms, allowing for effective and less costly inter-firm information exchanges
- boost competitiveness, especially in export markets
- create a basis for improvement and innovation, thereby 'levelling the playing field'.

2.1.2 Sector-specific impacts

Improvement to mandatory standards regulation in Australian consumer law

The Australian Treasury recently advised on reforms to the regulation of mandatory standards under the Australian Consumer Law (The Commonwealth of Australia 2024). The primary objective is to modernise the standards framework to enhance responsiveness, reduce compliance costs, and align more closely with international best practices of 48 mandatory consumer goods and product safety standards. Three options were discussed: the status quo, amendments to allow their Minister to more easily declare trusted overseas standards, and amendments to facilitate easier compliance with the latest versions of voluntary Australian and overseas standards.

The advice cited reviews by the Australian Competition and Consumer Commission, suggesting that improvements in the responsiveness of the standards system would result in potential business cost savings of AUD14–30 million (NZD15–32 million) for bicycle helmets and care labelling, respectively. The Australian Treasury stated that applying the relative benefits across all businesses (AUD10 million, or NZD11 million, per mandatory standard) would result in benefits of AUD500 million (NZD539 million) per year across all 50 standards. While the benefits would take time to become fully realised, the Australian Treasury expects the cost savings to business would flow onto consumers through reduced prices, greater product offerings, and improved product safety.

Using standards to improve sustainable energy use

In Singapore, standard SS 673 has been developed to strengthen the consistency and credibility of measuring, reporting, and verification processes for renewable energy usage (Singapore Standards 2025). By implementing SS 673, organisations can adopt a systematic approach to validate their renewable energy claims through well-defined governance frameworks, clearly established policies, and standardised procedures. This standard enables organisations to maintain accurate records, ensure credible renewable energy claims, and minimise the risks of double-counting and misreporting.

A case study involving Schneider Electric, a global organisation with annual revenues of NZD68.6 billion, demonstrated the effectiveness of SS 673. The implementation of the standard resulted in a 15 percent reduction in processing times, leading to enhanced productivity and cost savings. Additional benefits included improvements in operational quality and consistency, greater compatibility across international offices, and better traceability within their monitoring systems.

The effects of standards and regulations in different market structures

A study examined the effects of formal standards and regulations on innovation efficiency in German firms, considering the varying levels of market uncertainty (Blind et al. 2017). The authors found that, in stable, low-uncertainty markets, standards can increase innovation costs as established firms use them to create competitive barriers. On the other hand, regulations provide predictability, reducing costs. Conversely, in high-uncertainty markets, standards act as critical frameworks, mitigating uncertainty and aligning technological advancements, whereas regulations can raise costs due to potential misalignment with emerging technologies.



The assessment is based on two concepts:

- 1 Regulatory capture – certain stakeholders can influence the creation of regulations and standards to serve their own interests. This influence is more pronounced in low-uncertainty markets where established players can shape standards to maintain competitive advantages.
- 2 Information asymmetry – in uncertain markets, firms closer to the technological frontier possess more information than regulatory bodies, which can lead to misalignment between regulatory requirements and technological realities.

Table 4 Total effects of regulatory capture and information asymmetry on innovation costs

| Market uncertainty | Costs of regulatory capture on innovation costs | Costs of information asymmetry on innovation costs | Total effects on innovation costs |
|--------------------|---|--|-----------------------------------|
| High | Standards = Regulation | Standards < Regulation | Standards < Regulation |
| Low | Standards > Regulation | Standards = Regulation | Standards > Regulation |

Source: NZIER from Blind, Petersen, and Riillo (2017)

The research findings highlight the strategic use of standards and regulations based on market context, suggesting that policymakers should tailor their implementation to the level of market uncertainty. In mature, low-uncertainty markets, regulatory frameworks can provide stabilising benefits and lower costs for firms. In contrast, in emerging, high-uncertainty markets, standards play a more crucial role in guiding innovation without stifling technological advancement. This approach underpins the importance of aligning regulatory strategies with market dynamics to optimise innovation outcomes.

Developing the right approach to standards can be hugely beneficial to an economy. Standards are economic growth enablers.

2.2 Insights from stakeholders

To better understand the impact of standards in the New Zealand context, we interviewed a range of Standards New Zealand’s key stakeholders. The interviewees comprised New Zealand and international standards bodies, government agencies that use and participate in the development of standards, and industry representative bodies. The list of agencies we interviewed is listed in Appendix A.

The interviewees provided a wide range of insight into the benefits and constraints of standards and the standards system. These include difficulties in assigning an exact value to the benefits of standards, standards as an enabler of innovation, compliance issues, and constraints imposed by the current system.

All views in this section are those of the interviewees that we have summarised for this report.

Challenges quantifying the benefits of standards

Standards influence a wide range of outcomes, such as safety, quality, interoperability, and international trade, but these benefits are indirect and hard to measure. Often, their benefits are present throughout systems, supply chains, and risk management practices, making them hard to isolate or measure. Examples like the NZS 3604 timber framing standard or GS1's barcode system illustrate how standards quietly underpin entire sectors. However, there is often little visibility until something goes wrong. For example, in the leaky-homes crisis or costly product recalls.

There is currently no coordinated national effort to track the effectiveness of standards in New Zealand. Post-implementation reviews are rare, and feedback loops between regulation, industry, and standards committees are often informal. Interviewees discussed the difficulty of understanding the benefits of certain standards, as they are often part of the industry infrastructure and are required to operate effectively within the sector, tied to regulatory requirements. In sectors where compliance is non-negotiable (e.g. medical devices and utilities), standards are 'baked into the cost of doing business.'

Industry-specific applications

Interviewees were confident about standards being critical for ensuring consistency, quality, and safety across various sectors, including plumbing, electricity and construction. In the plumbing sector, standards underpin both training and regulatory compliance, but outdated standards hinder the adoption of modern techniques and materials. For instance, prolonged reliance on legacy standards without sufficient updates can compromise product quality.

In the electricity sector, aligning domestic standards with international benchmarks is crucial for ensuring equipment compatibility and safety assurance. The use of international standards, such as those set by the IEC, supports regulatory compliance and product reliability. However, the high costs associated with international committee participation and the voluntary nature of some standards reduce the ability to influence emerging areas such as smart grids and renewable energy systems.

In the construction and building sectors, standards have a significant impact on the entire supply chain, from early-stage product validation to end-stage consumer protection. While regulatory standards provide a baseline for compliance, many voluntary standards are perceived as excessive or unnecessary, creating a gap between minimum requirements and best practices. This discrepancy is particularly evident in building materials, where products meeting only the minimum standards may still pose risks, especially in areas prone to seismic activity or extreme weather conditions.

Funding and cost implications

The existing funding model for standards development in New Zealand presents a significant barrier to the timely update and effective implementation of standards. The reliance on a user-pays system creates financial disincentives for small and medium-sized enterprises to participate in the standards development process. This funding model also restricts the capacity of domestic industries to engage with international committees, resulting in missed opportunities to shape standards in emerging sectors such as renewable energy and digital infrastructure.



Additionally, inconsistent funding allocation across sectors exacerbates disparities in standards enforcement. While some sectors have access to targeted levies or industry contributions to fund standards development, others rely solely on voluntary contributions, leading to outdated or poorly maintained standards. Interviewees discussed possible solutions, including implementing targeted levies on licensed tradespeople, establishing public-private funding partnerships, or redirecting a greater portion of the building levy to support standards, development, and maintenance.

Inconsistent compliance issues

Compliance with standards is inconsistent across sectors, particularly where adherence is voluntary. The absence of mandatory enforcement mechanisms results in significant non-compliance, especially in sectors where low-cost, imported products are prevalent. This is particularly concerning in industries with direct public health implications, such as plumbing and drinking water safety, where voluntary lead-free transitions may not effectively mitigate risks.³

In sectors where regulatory standards exist, such as electricity and gas safety, enforcement is more robust due to established inspection and certification systems. However, voluntary standards remain underutilised, with some industry participants perceiving them as potential additional constraints rather than valuable quality benchmarks. This perception underscores the need for stronger incentives to promote adherence to voluntary standards and for more effective mechanisms to enforce compliance.

Innovation and adaptation challenges

The standards development process is often criticised for being too slow to adapt to emerging technologies and industry innovations. In sectors such as construction and manufacturing, standards are essential for ensuring product interoperability and safety, yet the lengthy revision cycles can stifle technological advancement. For example, while hydraulic crimping techniques offer more efficient plumbing solutions, the absence of updated standards to accommodate these methods creates regulatory ambiguity and market hesitancy.

In the electricity sector, the increasing integration of smart technologies and renewable energy systems requires timely updates to existing standards to address interoperability and cybersecurity concerns. However, limited domestic resources and funding constraints impede the ability to update standards swiftly, potentially hindering the adoption of innovative solutions in critical infrastructure sectors.

Trade integration

Alignment with international standards is essential for maintaining market access and ensuring product quality, particularly for export-oriented industries. Harmonising domestic standards with global benchmarks reduces trade barriers, enhances product credibility, and promotes regulatory compliance in target markets. However, the current funding and governance model restricts active participation in international standards development, limiting the ability of domestic industries to influence global standards in areas such as climate reporting, digital trade, and renewable energy.

³ Non-compliance to voluntary standards will have little impact compared to mandatory standards.

Moreover, the disjointed approach to standards development between New Zealand and Australia creates additional challenges. Divergence in standards can lead to inefficiencies, higher compliance costs, and market fragmentation. Strengthening collaboration on joint standards and exploring mutual recognition agreements could mitigate these risks and foster greater regional integration.

Governance and structural reform

Structural reform is identified as a critical area for enhancing the effectiveness of standards development and implementation. The current governance model in New Zealand, in which the standards body operates under government oversight while applying a user-pays model, creates conflicts between public interest objectives and commercial imperatives. This dual structure undermines stakeholder engagement and limits industry participation, particularly from smaller firms.

Proposed reforms include establishing an independent standards body with dedicated funding, implementing systematic reviews of existing standards, and enhancing transparency in committee selection to prevent dominance by vested interests. Additionally, integrating post-implementation reviews could help assess the efficacy of standards in achieving their intended regulatory and economic outcomes, ensuring that the standards remain relevant and fit for purpose. The current approach to standards funding in New Zealand may not maximise economic growth potential in standards.



3 Modelling the economic impacts

In this section, we describe the basis for our economic modelling, how we measured the impacts of increasing standards in New Zealand, and how the results are distributed across the various parts of the economy and society.

3.1 Why do we use a CGE model?

CGE models are built using real-world data to help us understand the economic effects of a new policy, technology, or other external events. These models show how a change in one part of the economy, like a specific industry, can affect the whole economy. This includes direct effects on the industry itself and indirect effects on related industries, such as suppliers, competitors, and the labour and capital markets.

Importantly, these indirect effects can be larger or smaller than the direct effects. CGE models are useful as they give us the full picture of how a change can ripple through the economy.

CGE models are especially valuable when traditional tools like econometrics or multiplier analysis can't be used. Because of their strengths, organisations like the OECD, IMF, and World Bank regularly use CGE models to analyse economic impacts.

More technical details about NZIER's TERM-CGE model and how it was applied in this analysis can be found in Appendix B.

3.2 How we use the model

To estimate the economic impact of a change in the stock standards, we apply the associated productivity improvements based on findings from the established literature (see section 2.1.1). For example, one estimate suggests that a 1 percent increase in the number of standards is associated with a 0.10 percent rise in TFP across the economy (BERL 2011). In our model, we apply this productivity improvement across all industries as we do not have sector-specific information for estimates. This new economy is then compared to the baseline 2020 economy (this is the modelling counterfactual).

The estimates in the established literature are based on a simple version of the economy that includes just labour and capital. In our analysis, we build on this by also including land and goods used between industries (called intermediate inputs). This gives us a fuller picture of how standards can improve productivity throughout the whole economy.

3.3 Design philosophy

We've kept this analysis intentionally simple. To do that, we left out the full complexity of the standards and only included enough detail to help show their benefits. Real-world problems usually involve many variables and complicated relationships. Instead of trying to cover everything, we've focused on the key points. This helps us understand the issue more clearly and move toward useful solutions. However, by simplifying things, we risk leaving out important details that could affect how well we understand the whole problem.



3.4 Assumptions

Due to limitations in the data and information on how standards impact productivity in New Zealand, we make several necessary assumptions, including:

- that increase in the stock of standards are fit-for-purpose, meaning they are designed, implemented, and disseminated effectively, reflecting their average historical impact
- the resulting productivity gains are spread evenly across all sectors
- there are no diminishing returns to standards, even though these may occur in practice
- the economy adjusts to fully utilise the productivity gains by investing in new capital, while the population remains constant.

An alternative scenario is included at the end of this section, showing the estimated impact if standards deliver only half the long-term average effect in the New Zealand context.

3.5 Summary results

We set out a range of potential macroeconomic impacts resulting from productivity improvements associated with a 1 percent increase in the stock of standards. Table 5 lists the productivity estimates that have been updated in the model, along with the corresponding results for average real wage, aggregate capital, real household consumption, and real GDP. For each productivity type assessed, the lowest and highest impacts are used based on the literature highlighted in section 2.1.

For each scenario, the results show that an increase in:

- LP of between 0.05–0.36 percent grows real GDP by \$0.2–1.1 billion
- TFP of between 0.10–0.17 percent grows real GDP by \$1.1–1.9 billion.

Our assessment shows that an increase in LP of between 0.05 and 0.36 percent increases real GDP by 0.05–0.35 percent, or between \$158 million and \$1.1 billion. This also increases wages (0.04–0.29 percent) and results in higher household consumption (0.5–0.33 percent). Greater LP also results in more use of capital inputs to support increased labour productivity of between 0.05 and 0.35 percent. Increases in TFP yield greater relative economic impacts than just increasing LP alone.

Increases in TFP of between 0.10 and 0.17 percent results in real GDP improvement of 0.34–0.58 percent, or between \$1.1 billion and \$1.9 billion. This also has a greater relative impact on real wages, ranging from 0.49–0.84 percent and household consumption (0.36–0.61 percent). While TFP productivity improvements mean that we use labour and capital inputs more effectively, increases in TFP will also result in increases in the total amount of capital inputs used (0.22–0.37 percent).



Table 5 Economic impacts of a 1 percent increase in standards

In percentage change based on real GDP in 2020 dollars.

| Scenario | Assumptions | Impacts | | | |
|----------|--------------------------|-------------------|-------------------|----------------------------|----------|
| | Increase in productivity | Average Real Wage | Aggregate Capital | Real Household Consumption | Real GDP |
| TFP low | 0.10% | 0.49% | 0.22% | 0.36% | 0.34% |
| TFP high | 0.17% | 0.84% | 0.37% | 0.61% | 0.58% |
| LP low | 0.05% | 0.04% | 0.05% | 0.05% | 0.05% |
| LP high | 0.36% | 0.29% | 0.35% | 0.33% | 0.35% |

Note: 'Real' measures are net of price changes.

Source: NZIER

Each of the four scenarios outlined above illustrates the benefits of standards in different ways. Estimates based on TFP highlight that standards contribute to improvements across the entire economy, including labour, capital, land, and intermediate inputs. In comparison, LP focuses solely on gains related to labour, overlooking the broader productivity effects on other key inputs. In contrast, TFP provides a more comprehensive picture of the economy-wide benefits that stem from standardisation.

3.6 How are the impacts distributed across the economy?

Increasing the stock of standards generates benefits across the economy, including both the private and public sectors. To assess the distribution of the impacts, we examine the proportion of GDP growth attributed to each part of the economy. Growth in GDP is expressed using the expenditure method, which is the sum of all final goods and services purchased in an economy. Expenditures include consumer spending, government spending, business investment spending, and net exports.

Across the four estimates examined, we find that the share of total additional GDP attributed to the public sector, from increased expenditure, ranges between 18 and 20 percent. The remaining gains are captured by the private sector.

Productivity improvements drive economic impacts through several channels. Higher average real wages, reflecting the increased value of labour, lead to greater real household consumption as households can purchase more goods and services. Higher real household consumption reflects a higher measure of welfare.

Government expenditure increases as higher household consumption and overall economic activity generate additional tax revenue. This allows for greater investment in public services such as infrastructure, education, and defence, while also enabling more efficient delivery of these services from higher total productivity.



As industries become more productive and expand output, exports increase, supported in turn by rising imports to produce goods. Rising investment reflects the growing demand for capital to drive economic growth.

- Under the LP scenario, the real GDP increase of between \$0.2 billion and \$1.1 billion is broken down as increases in:
 - real household consumption by \$88–\$625 million
 - real investment increases by \$36–\$259 million
 - real government expenditure by \$28–\$200 million
 - real net exports by \$6–\$45 million
 - nominal tax revenue by \$12–\$83 million.
- Under the TFP scenario, the real GDP increase of between \$1.1 billion and \$1.9 billion is broken down as increases in:
 - real household consumption by \$0.7–\$1.2 billion
 - real investment increases by \$169–\$288 million
 - real government expenditure by \$219–\$372 million
 - real net exports by \$22–\$37 million
 - nominal tax revenue by \$91–\$154 million.

3.7 Time frame of analysis

Our NZIER TERM CGE model is a static model. This means that we show how the current economy would change if there were productivity improvements from a 1 percent increase in the stock of standards, compared to a situation without that increase at that point in time. Our analysis focuses only on the economic impact and does not estimate how long it would take to develop and implement these high-quality standards.

3.8 Caveats and limitations

The approach to understanding value highlights the impact of standards and their impact on efficiencies (technical, allocative, and dynamic) that currently support the long-term growth and well-being of New Zealand.

However, there are shortcomings:

- The methodology focuses on the introduction of new standards, with limited consideration of the value derived from updating or revising existing standards.
- The analysis reflects the growth in standards during the time periods studied, which may not align with the current structure or needs of the New Zealand economy.
- There is a lack of detailed, sector-specific data to capture variations in how different industries are affected by standards.
- The model uses an average composition of standards and does not isolate the effects of relying solely on ISO or Australian standards.



- It does not consider the economy’s capacity to absorb and apply new standards effectively. The presence of more standards alone is not sufficient; benefits depend on the quality of design, relevance to local challenges, and the effectiveness of implementation. The analysis assumes that impacts observed in previous research hold true for New Zealand.

3.9 How do these estimates compare to other measures of the New Zealand economy

We have presented a broad range of results based on productivity gains associated with an increase in the stock of standards. This wide range reflects the reality that the impact of standards can differ significantly across economies.

TFP is our preferred measure

We use TFP as the preferred measure, as it captures a more comprehensive view of productivity improvements than labour productivity alone. By drawing on multiple data sources and presenting both upper and lower bounds of potential outcomes, we aim to offer a realistic range of effects for New Zealand.

Based on existing research, we consider the lower end of the TFP range as the most plausible outcome for New Zealand. This is supported by evidence from the New Zealand case study conducted by BERL (2011).

To assess the validity of the estimates, there are two key comparisons that can be made.

- How have factor productivity trends in New Zealand evolved, and how do these compare to the model inputs?
- How do other studies estimate the long-term contribution of standards to economic performance?

3.9.1 How do factor inputs vary over time?

During the period covered by the New Zealand-specific study (1979–2009), average simple annual TFP growth was 1.0 percent, and GDP was 2.5 percent.⁴ Using BERL’s (2011) estimate of 0.1 percent increase in TFP as a result of increasing standards by 1 percent, we estimated that 10 percent of the historic growth was attributable to standardisation, assuming standards increase by 1 percent annually.

More recent data from Stats NZ shows that between 1996 and 2023:⁵

- average annual LP growth was 1.2 percent
- average annual TFP growth was 0.5 percent.

If we apply productivity impacts reported in international studies on top of these base rates, potential increases in growth become more substantial. Specifically:

- LP growth could rise by 4 to 30 percent
- TFP growth could increase by 20 to 34 percent

⁴ These estimates are taken from Stats NZ productivity data which estimates growth in ANZSIC06 divisions A to K, and R.

⁵ These estimates are taken from Stats NZ productivity data which estimates growth in ANZSIC06 divisions A to K, M, N, R, and S, and industry LL1. This is the preferred measure but only is available from 1993.



These figures are assuming that current growth is not included, which is unlikely to be the case.

3.9.2 How do other studies estimate the contribution of standards over time?

Table 6 summarises the average economic impact of standardisation across the various study periods. These studies consistently show that standards have contributed between 9 and 28 percent of GDP growth over time. Between 2010 and 2020, GDP grew by an average of 2.8 percent. Applying an annual 1 percent growth rate in standards would account for 12 percent of that growth rate.

Table 6 GDP contribution of standards over time

| Country | Year | Period of analysis | Contribution of standards to growth in GDP |
|------------------|------|--------------------|--|
| Belgium | 2020 | 1994-2018 | 19% |
| Canada | 2007 | 1981-2004 | 9% |
| Canada | 2021 | 1981-2019 | 17% |
| France | 2009 | 1950-2007 | 24% |
| Nordic Countries | 2018 | 1976-2016 | 28% |
| UK | 2015 | 1921-2013 | 28% |

Note: though the estimated functions differ, they highlight the importance of standards to economic growth.

Source: NZIER

An example in monetary terms that can be used is Canada (a study from 1981 to 2019). In 2019, standards were estimated to account for \$7.1 billion (NZD) to the Canadian economy, which is roughly 8.3 times larger than New Zealand's economy (Liao 2021).

3.10 Additional results

Table 8 below includes the New Zealand study as well as an estimate with half of the impact to capture the impact if the impacts of standards had been halved (BERL 2011). If this is the case, the impact of a 1 percent increase in standards would increase GDP by \$547 million.

Table 7 Economic impacts of a 1 percent increase in standards

In percentage change based on real GDP in 2020 dollars.

| Scenario | Assumptions | Impacts | | | | |
|----------------|--------------------------|-------------------|-------------------|----------------------------|--------------|------------------------|
| | Increase in productivity | Average Real Wage | Aggregate Capital | Real Household Consumption | Real GDP (%) | Real GDP (\$ millions) |
| NZ average | 0.10% | 0.49% | 0.22% | 0.36% | 0.34% | \$1,095 |
| NZ half impact | 0.05% | 0.25% | 0.11% | 0.18% | 0.17% | \$547 |



Note: 'Real' measures are net of price changes.

Source: NZIER

4 Market and non-market impacts of standards

To further understand the full economic impact of standards it is necessary to broaden the definition of economic value to include the ways in which standards support the well-being of New Zealand beyond market transactions. The benefits of standards extend beyond monetary measures and reach more than just the users and buyers. These non-monetary benefits may be realised by the businesses that implement the standards, by consumers of the associated products or services, or by wider society, including those not directly involved.

The non-market benefits of standards are likely substantial, even though there is limited evidence quantifying the overall split between market and non-market benefits. Nonetheless, the importance of the benefits of standards should not be understated. It is crucial to distinguish between these types of benefits and to understand the different drivers behind them, such as the role of international engagement, to achieve them.

Below is a list of some non-market benefits that are provided by standards, as well as a description of their impact:

- **Consumer confidence** – standards assure that products and services meet established quality and safety standards. Examples include AS/NZS ISO 9001, which specifies requirements for a quality management system when an organisation needs to demonstrate its ability to consistently provide products and services. This is widely utilised in the manufacturing sectors (Standards New Zealand 2016).
- **Health and safety** – standards set minimum requirements to protect public health and ensure safety across various industries. Examples include AS/NZS ISO 45001, which specifies requirements for an occupational health and safety management system, and gives guidance to provide safe and healthy workplaces by preventing work-related injury and ill health (Standards New Zealand 2018).
- **Emissions reductions** – environmental standards help measure emissions and promote sustainable practices to protect the environment (ISO 2018). ISO 14055-1:2017 also provides guidelines for establishing good practices for combating land degradation and desertification to help achieve climate neutrality and become resilient and adaptive to climate change.
- **Social inclusion** – standards such as NZS 4121 set design standards for buildings accessible to people with disabilities (Standards New Zealand 2001).
- **Interoperability** – the ability of systems, products, or components to work together.



4.1.1 Public funding of standards overseas recognises the wider value of standards across the economy and society

Different international standards bodies have different funding systems in part to reflect the large proportion of non-market benefits that result from standards, such as public health, safety, consumer and environmental protection. The following examples illustrate the funding sources for various organisations.

- Standards Singapore is predominantly publicly funded, receiving SGD279.3 million (NZD362.9 million) in public operating grants in the 2024 financial year. Additional revenue of SGD13.1 million (NZD17.0 million) was generated through other sources, such as service fees and project-based contributions (Enterprise Singapore 2024).
- Standards Australia is a non-government membership-based company registered with the Australian Charities and Not-for-profits Commission (Standards Australia 2024). They are funded through revenue from publication sales, including royalties, investments, and grants, receiving AUD7.9 million from the government in 2024.

4.1.2 The proportion of New Zealand standards with market and non-market impacts

Although it is difficult to determine the split of benefits to market and non-market benefits for standards, some frameworks can be utilised for the assessment of benefits. Standards New Zealand has assessed the proportion of standards that have some form of non-market benefit across the major standards categories.

Overall, 82 percent of standards assessed have some form of non-market benefits (personal communication with Standards New Zealand). This highlights the additional potential value captured outside GDP figures. Of the 82 percent, 70 percent of these standards are cited in legislation. Having some form of non-market benefits highlights the mixed benefits occurring from standards, each having a unique proportionality of benefits.

SNZ make several assumptions for the initial assessment:

- any standards cited in legislation have non-market benefits
- the non-market benefit must be intended and clear
- assessed the 90 percent most accessed standards from within each sector.

Although this high-level assessment offers a strong overview of standards with some non-market benefits, several non-cited standards provide potentially large non-market benefits with minimal access events. Examples of this are AS/NZS 5848:2000 and NZS 3910:2023.

- AS/NZS 5848:2000 is the 'Code of Practice' for bungy jumping, which specifies and gives guidance on the site and site approval, the design, testing and approval of equipment, the management of the operation, the operating procedures, the emergency provisions and procedures and registration of operating staff of a bungy jumping operation. Although accessed by very few tourism operators, this plays a critical role in ensuring customer safety, providing a degree of trust, confidence, and reputation in the New Zealand adventure tourism industry (Standards New Zealand 2000).



- NZS 3910:2023 reduces the burden on the legal system by providing a standard form of general conditions of contract for incorporation into construction contract documents. It enables the parties to the contract to quickly establish contractual arrangements that deliver a wide variety of building and civil engineering projects. Contracts based on this standard will be comprehensive but at the same time easy to understand and will reflect fair-risk allocation between the parties (Standards New Zealand 2023b).

Table 8 Number and percentage of standards that contribute to market and non-market impacts

| Sector | Standards assessed | Standards that contribute to non market benefits | Cited standards | Percentage of standards that contribute to non market benefits |
|---|--------------------|--|-----------------|--|
| Building Construction and Fire Prevention | 357 | 328 | 304 | 92% |
| Business and Trade Count | 139 | 77 | 46 | 55% |
| Consumer and Occupational Safety | 223 | 204 | 159 | 91% |
| Digital and Media | 61 | 37 | 32 | 61% |
| Education and Training | 6 | 4 | 0 | 67% |
| Energy, Electricity and Gas | 527 | 453 | 401 | 86% |
| Engineering | 55 | 34 | 29 | 62% |
| Environment and Sustainability | 89 | 66 | 42 | 74% |
| Healthcare and Community Services | 43 | 43 | 40 | 100% |
| Local Government | 7 | 7 | 6 | 100% |
| Manufacturing and Processing | 113 | 54 | 47 | 48% |
| Primary Industries | 5 | 3 | 3 | 60% |
| Tourism and Hospitality | 1 | 1 | 0 | 100% |
| Transportation and Logistics | 132 | 123 | 116 | 93% |
| Total | 1758 | 1434 | 1225 | 82% |

Note – the same standards can be in multiple industry sectors.

Source: Standards New Zealand



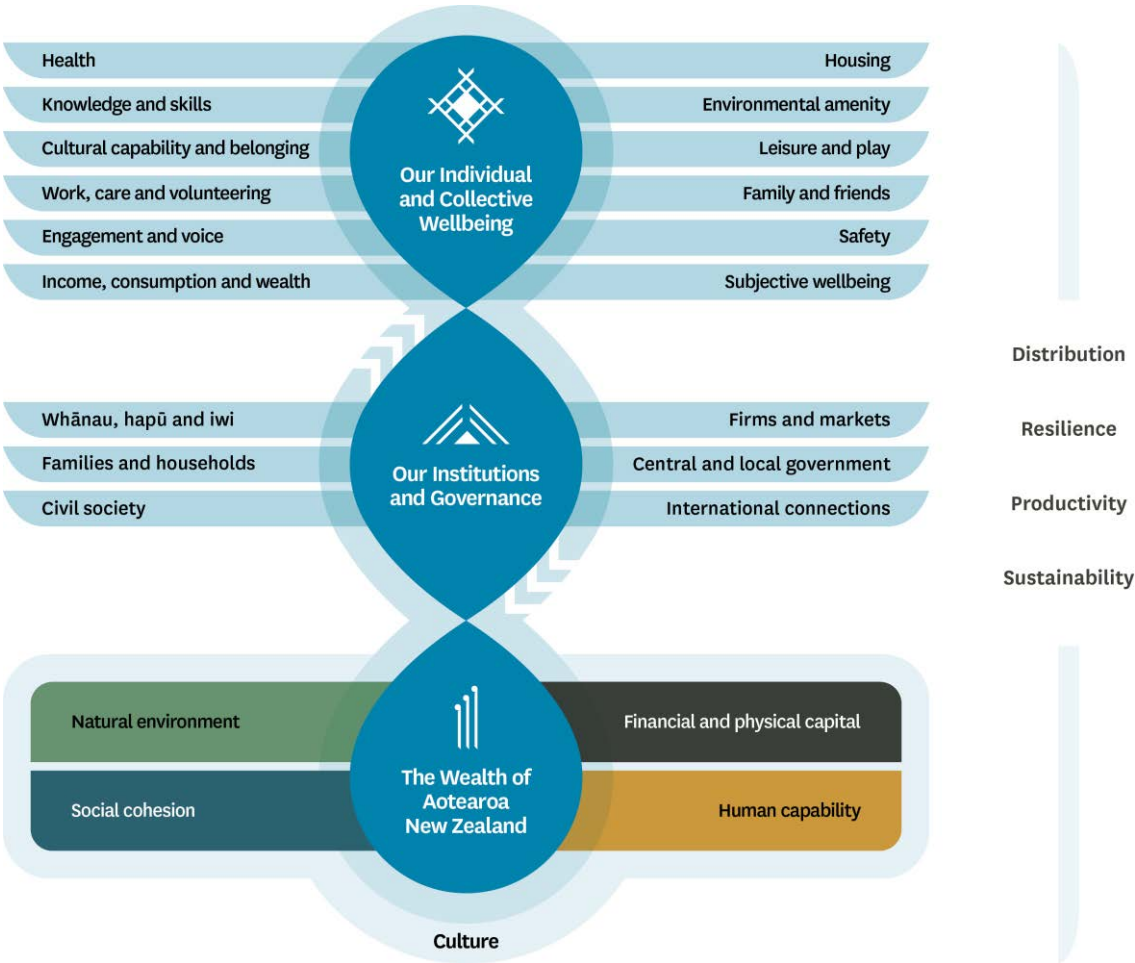
4.2 How standards contribute to wellbeing using the Treasury Living Standards Framework

The Treasury Living Standards Framework (2022) is useful as a way to organise the identifiable market and non-market impacts of standards across various wellbeing domains. This helps us understand who the benefit of the standard might be accruing to. We categorise monetary and non-monetary standards, identifying who the primary benefit accrues to, as standards play a role in all domains.

The framework consists of a range of well-being domain groups across three levels: our individual and collective well-being, our institutions and governance, and the wealth of Aotearoa New Zealand. It is important to note that impacts can contribute to more than one domain within a level and across multiple levels, depending on the issues being investigated.

For this assessment, we use the second tier of this framework, which captures the role our institutions and organisations play in facilitating the well-being of individuals and collectives, as well as safeguarding and building our national wealth. All the benefits of standards can be placed into this framework.

Figure 1 The Treasury’s Living Standards Framework



Source: The Treasury (2022)



4.3 Assessment of the market and non-market impacts of standards

A summary of the market and non-market impacts we found through our research is shown in Table 9 below. This is an inexhaustive list based on the available data and literature at the time of writing this report. The gaps identified provide opportunities to further build the evidence base of how standards contribute to the economy and society as a whole by additional data collections and focused research. Each impact is described further under the table below.

Table 9 Market and non-market impacts of standards

| Category | Impact |
|--|---|
| Market impacts | |
| Operational efficiency improvements | Standards increase the value of the construction sector. 61 percent of businesses agreed that they saved money because of standards and 52 percent found standards helped them grow their businesses. |
| Export enhancement | The value of additional trade enabled by standards for New Zealand over the 1995–2019 period is around \$3.4 billion. |
| Standards NZ expenditure | Income from selling standards and related documents, memberships, and consulting services is around \$5 million annually. |
| Increase in productivity/uplift in GDP | Standards increase productivity. ISO found that the average sales increase by 3-8 percent after the adoption of certain standards. |
| Compliance burden | Standards can reduce compliance burden and enable more efficient business. The construction sector found 93 percent of firms had a reduced compliance burden as a result of standards. Just 1 hour of reduced time on compliance activities results in cost savings of \$33. |
| Non-market impacts | |
| Safety | Work-related health and safety issues cost \$4.9 billion in 2023. This includes lost lives, lost earnings, serious injury costs to ACC and health issues. |
| Consumer assurance | Standards can increase consumer confidence. |
| Environmental | Standards can help measure environmental impact. Through the Carbon Neutral Government Programme, using ISO 14064-1:2018, Kāinga ora online reduced its carbon impacts by up to \$40,000 over three years. |
| Non-compliance costs across systems | Standards reduce ambiguity for adhering to rules and regulations, reducing costs associated with non-compliance. Non-compliance is a key issue for the government and is a main function of many government agencies. WorkSafe, as an example, spent \$142 million in 2024 across its functions on dealing with non-compliance. This shows some of the size and scale of resources being spent on this issue that could be used for other purposes. |

Source: NZIER

In the section below, we describe the identified impacts in greater detail and discuss the implications that the impacts have on our individual and collective wellbeing in the New Zealand context.



Operational efficiency gains

Standards provide numerous benefits from cost efficiency gains, such as reduced compliance costs, economies of scale, better product quality and reduced duplication, all of which increase business success.

Reduced compliance burden on firms

Economic savings from clear, harmonised, and consistent standards, reducing enforcement and compliance costs. Standards New Zealand's building sector sponsored standards survey found that 93 percent of respondents agreed that sponsored standards made it easier to comply with regulations (Standards New Zealand 2025).⁶

This is a large benefit as the cost of an individual's time is \$33 per hour (The Treasury 2024; Standards New Zealand 2025). Though it's difficult to determine the number of hours saved from reduced compliance time as a result of standards, the benefits are likely significant.

Economies of scale

Centralised coordination of operations can also reduce administrative and operational costs by increasing the speed of industry. Fifty-six percent of the building sector agreed or strongly agreed that standards help the design and make the build go faster (Standards New Zealand 2025).

Standards can reduce duplication and lead to better quality

Savings are achieved by centrally coordinating standards development rather than multiple industries or sectors individually developing their own. The building sector also uses centralised deposits from standards, with 97 percent of respondents using Standards New Zealand (including NZS and AS/NZS publications) annually. Sixty-five percent of respondents agreed that sponsored standards helped them improve the quality of their building-related products and services (Standards New Zealand 2025).

Standards help lead to business success

The combination of these benefits also helps businesses to thrive. Businesses saved money (with 61 percent of businesses surveyed agree/strong agree that standards saved them money – with only 8 percent disagree/strong disagree) and that they supported the growth and success of our business (52 percent of businesses surveyed agree/strong agree that standards saved them money – with only 7 percent disagree/strong disagree) (Standards New Zealand 2025).

Facilitation of trade and commerce

Standards provide a vital tool for building international relationships and enabling international trade.

International engagement

A proportion of the work undertaken by Standards New Zealand focuses on international engagement and participation in international standardisation, being one of the established rules-based systems and global quality infrastructure, to promote general economic prosperity and national interests. Most international engagement is funded by the sale of standards, with benefits being more widely felt. By engaging in international forums and representing New Zealand interests, New Zealand increases its reach to help maintain and develop international trade linkages and have a New Zealand voice at the table.

⁶ Taken from the building sector sponsored standards survey insights.



Without this participation and these international connections, these dynamic efficiencies may be lost, and relationships may weaken. Some examples of international engagement include:

- various regular meetings of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC)
- engagement with the World Bank, World Trade Organization, APEC, and the United Nations International Development Organisation
- hosting international standards organisation representatives in New Zealand
- engagement in the Pacific, including Pacific Quality Infrastructure, Pacific Islands Standards Committee forums, Pacific Area Standards Congress, and providing capability building initiatives and access to New Zealand standards for use in the Pacific Islands.

Using the LSF, these benefits can be categorised towards international connections, central and local government, and firms and markets. These activities play a critical role in generating non-market benefits from standards.

Export enhancement

Standards provide consistent criteria for businesses and organisations worldwide, ensuring that products and services meet global benchmarks and can be traded across borders. This harmonisation helps companies navigate complex trade regulations and gain access to new markets. As market access and global trade grow, it is even more important to ensure that products and services adhere to international standards, which set the foundation for efficiency, quality, and safety in the global marketplace.

Market access and international trade are key mechanisms through which standards drive productivity. Research that used a gravity model of trade to estimate the contribution of standards to exports from the six countries in this study to 66 other countries from 1995 through 2019. They found that standards are associated with around 9 percent of the total growth in exports (Vennerød et al. 2023). Applying this in the New Zealand context, we find standards may be responsible for around \$3.4 billion in new trade across the same period.

Innovation and productivity support

Standards formalise best practices, making implicit technical knowledge explicit and transferable. Benefits come from training, workshops, and educational materials, enabling innovation adoption and productivity gains. There is little evidence in the New Zealand economy about what percentage of productivity is from an uplift in standards. Overseas examples from the ISO show a range of growth at a firm level with an increase in sales between 3 and 8 percent (ISO 2014).

Risk management and public safety

Increased compliance across systems

Standards are well established as a means for greater compliance across systems, and compliance with a standard can often be used to demonstrate compliance with rules and regulations (Ministry of Business, Innovation & Employment 2018).



Legislation may make them expressly mandatory or cite them as ‘acceptable solutions’ or as ‘means of compliance,’ while still permitting alternative approaches that meet the same statutory criteria. Regulators frequently embed them in industry guidance and audit-certification frameworks, and they are used in court to show that reasonable care has been exercised in managing risk (Standards New Zealand, n.d.-b).

Although there is no definitive number on the total cost of non-compliance in New Zealand, organisations like WorkSafe, the Commerce Commission, and many other government agencies and ministries are dedicated to ensuring compliance and dealing with non-compliance. In the 2024 financial year, WorkSafe alone conducted:

- 12,159 assessments – targeted and planned examinations of the effectiveness of health and safety management
- 141 health and safety investigations and 69 prosecutions – to ensure businesses not meeting their obligations are held accountable
- 5,097 improvement notices – a notice changes required within a certain time period to improve a risky situation.

WorkSafe also committed \$3.4 million as part of their enforcement undertakings to improve health and safety outcomes in their workplaces, industries and communities. Across its functions, WorkSafe’s costs of service totalled \$142 million in 2024 (WorkSafe New Zealand 2024).

Increased health and safety outcomes

The cost of non-compliance is greater than just that of public sector administration costs; it also includes the private costs to individuals, households and communities. Health and safety standards play a large role in reducing injuries and preventing fatalities. CBAX estimates that the value of human life in 2025 ranges from \$10 million to \$15 million between the low and midpoint values, and reductions in emergency room visits save \$655 per visit (The Treasury 2024).⁷

In total, workplace harm is estimated to cost between \$4.4 billion and \$4.9 billion between 2022 and 2023, including costs to ACC, private losses through lost income, the statistical value of life and health effects costs (Business Leaders’ Health & Safety Forum 2024). Studies have found that the implementation of health and safety standards and respective accreditations reduces workplace injuries by around 20 percent (Viswanathan et al. 2024). Broadly applying this reduction to the total cost in New Zealand illustrates the size of the benefits of health and safety standards of around \$880 million to \$980 million.

Environmental amenity

Standards help environmental outcomes by providing tools for measurement and understanding of environmental impacts, as well as setting a minimum efficiency level that manufacturers must meet. An example of this is ISO 14064-1:2018, which is an internationally recognised standard for quantifying, monitoring, reporting, and verifying greenhouse gas emissions and removals. This is important as it allows setting and measuring emissions reduction targets.

⁷ The CBAX tool is a spreadsheet model that contains a database of values to help agencies monetise impacts.



Though there are no clear national values, this standard is being used by the New Zealand public sector as part of the Carbon Neutral Government Programme. It aims to embed emissions management into organisational processes to support New Zealand's commitment to climate leadership and the goal of achieving carbon neutrality (Ministry for the Environment 2021).

As part of this initiative, which is supported by the standard, Kāinga Ora has replaced 24 petrol vehicles with fully electric vehicles, saving an estimated 208 tonnes of carbon between 2022 and 2025. Using the shadow price in the CBAX model, the savings of \$100 to \$200 per tonne of Co₂, this is estimated to save between \$20,000 and \$40,000 (Ministry for the Environment 2022; The Treasury 2024). This example highlights the impact of one agency's change in practices being supported by standards; if this were applied across the public sector, the benefits would be large.



5 Discussion and recommendations

5.1 Research summary

Standards play a fundamentally important role in the economy, delivering benefits to businesses and the broader public. Both the interviews conducted and the literature reviewed consistently emphasise the critical importance of standards in supporting business growth and driving economic development. While the specific contribution of standards to business performance is inherently challenging to quantify, it is equally difficult to envision a functioning, modern economy without them.

Different countries apply diverse operational models for standards, offering potential pathways that New Zealand may consider in the future. These varied systems bring distinct advantages, and by observing them, New Zealand can identify opportunities for refinement and improvement. Although our current system has some recognised weaknesses, it continues to produce and adopt a significant number of standards across sectors.

While the incremental impact of expanding the stock of standards may appear modest at a national level, the role of standards is crucial in addressing the persistent productivity challenges facing the country. Increasing the breadth and depth of standards will be a key enabler in helping New Zealand make meaningful progress toward its productivity and economic goals.

5.2 Demonstrating the value of standards and the standards system

This report highlights the importance of standards in New Zealand and the potential for a stronger standards system to grow the value of the New Zealand economy. We estimate the economic impact that a marginal increase in the stock of standards can have on GDP through an uplift in firm productivity. These impacts are then apportioned across the private (firms and households) and public sectors (government). Up to 20 percent of the economic impacts are attributable to increases in government spending, which are generated through increased tax revenue from higher firm profits and real wages and incomes.

The notion of 'economic value' is then expanded upon to include both market and non-market impacts. Market impacts of standards include reduced compliance and operating costs, as well as greater access to international markets and trade. Non-market impacts include greater compliance across systems, reductions in harm and injury, stronger relationships with official international counterparts, and better environmental outcomes.

While we have attempted to demonstrate the value of standards across each of the segments described, a general lack of evidence from robust sources means that further research and information gathering are needed to articulate the overall value for New Zealand better. This report, therefore, highlights areas where additional research can be prioritised based on the focus areas of international literature.



5.3 Future research opportunities and information gaps

To better measure and understand the role of standards, several questions can be asked:

- Which standards have the best return on investment?
- Where does international interest lie with respect to standards development?
- How can we better utilise international engagement better?
- What local changes would help?
- How can we learn from other countries' systems?

5.4 Concluding comments

New Zealand's standards system is a quiet workhorse and critical piece of infrastructure in the economy. Even a modest, 1 percent lift in the stock of standards could raise real GDP by between \$0.16 and \$1.9 billion, with up to 20 percent of those gains flowing directly into the government that provides services and infrastructure. Beyond these market effects, four-in-five standards generate non-market benefits such as safer workplaces, lower emissions, and greater consumer trust. These outcomes do not show up in GDP but matter for wellbeing.

International comparisons show that when governments co-invest, through baseline funding, transparent benefit tests, and regular post-implementation reviews, standards can become a sharper tool for productivity and policy goals.

A stronger, more deliberately funded standards system is a low-risk, high-return lever for boosting productivity, lifting household incomes, and advancing public-good objectives. Targeted public investment, better data on costs and benefits, and ongoing evaluation will unlock the full economic and social value of standards for New Zealand.



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Appendix A The standards system

A.1 What is a standard?

There is still no single, universally accepted definition of what a ‘standard’ is in the literature. Definitions vary widely, ranging from broad conceptualisations to highly specific technical descriptions. The spectrum ranges from:

“pieces of general advice offered to a large number of potential adopters”
(Brunsson and Jacobsson 2000)

To more technical definitions, such as:

“a document, established by consensus and approved by a recognised body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context” (de Vries 1999)

A useful definition is:

“a set of technical specifications that can be adhered to by a producer, either tacitly, or in accord with some formal agreement, or in conformity with explicit regulatory authority.” (David and Shurmer 1996)

And from ISO:

“a document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.” (ISO, n.d.)

This definition focuses on how standards emerge. That is, standards are developed through:

- Market mechanisms, where adoption is tacit and evolves organically within a community of users
- Formal agreements, where adherence to the standard may be voluntary or mandatory, often developed by standards-setting bodies.

This paper focuses on standards developed through formal agreements within Standards New Zealand. Standards New Zealand is the national standards body responsible for developing, publishing, and selling standards, as well as participating in the development of international standards. It collaborates with various sectors to develop, update, and implement standards that enhance quality, safety, and efficiency across industries (see Standards New Zealand, n.d.-a).

A.2 The characteristics of standards

Standards, while often associated with technical aspects of goods, can be viewed as both private and public goods, depending on the context and their characteristics. Private standards, such as those set by manufacturers for their products, are typically used to benefit specific producers and consumers within a market and can be promoted through advertising. Public standards are designed to benefit the public at large and may be mandatory or voluntary (Smith 2009).



The lines between private and public benefit are becoming increasingly blurred, particularly in the realm of standards development. Historically, standards developed by standards organisations were considered public goods, benefiting all and not excludable. However, the rise of private consortia has introduced vested interests and commercial considerations, shifting standards towards a ‘quasi-public’ status, where benefits are more targeted and potentially less widely available.

This shift is influenced by factors such as public-private collaboration, the commodification of research, and increased competition for public funding, leading to a more nuanced understanding of the public and private roles in standards development (Bunduchi, Williams, and Graham).

A.3 The role of Standards New Zealand

Standards New Zealand is the national standards body for New Zealand. Its functions include representing New Zealand on the international stage, developing and reviewing standards, including adopting international standards, and selling access to standards.

It forms part of the wider standards system, which includes organisations across the public and private sectors (Standards New Zealand 2023a):

- Standards Development Committee
- New Zealand Standards Executive (Ministry of Business, Innovation & Employment)
- Standards Approval Board (SAB)
- Standards Australia, ISO and IEC
- Industry
- Regulators
- Consumers.

A.4 New Zealand’s stock of standards

Standards New Zealand has over 6,800 standards live for access by businesses and individuals. New Zealand standards account for 13 percent of the total number of standards available. Joint AS/NZS developed standards and adopted international standards, comprising 42 percent and 26 percent, respectively. Just under half of the available standards (45 percent) are classified as ‘current,’ with just over a third (35 percent) superseded and 20 percent having been withdrawn but still available.

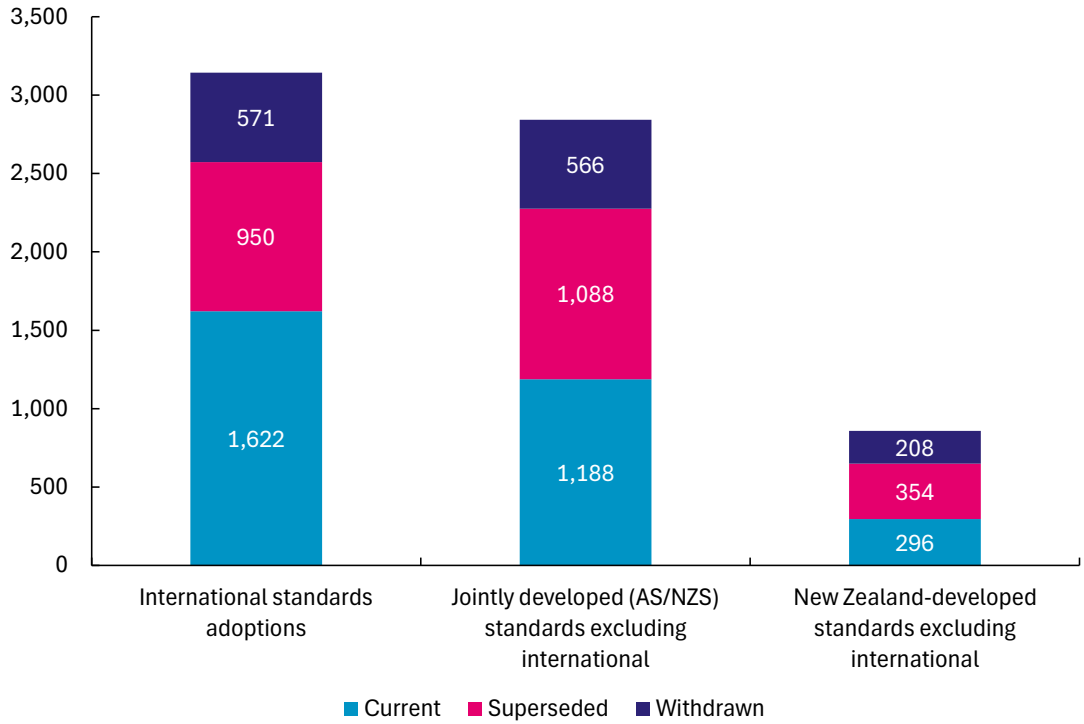
Most standards are voluntary in that they are not cited in New Zealand legislation. Voluntary standards account for 87 percent of the total number of standards available, while the remaining 13 percent of standards are cited. Although voluntary standards make up the majority of the standards available, they represent 41 percent of the total number of times standards are accessed by customers.

The stock of standards in New Zealand has been growing each year, as shown in Figure 3. Around 95 percent of the standards available have been published since the 1990s. However, the stakeholders we interviewed expressed concerns about the rate of developing or reviewing standards. More than a quarter of the standards (28 percent) are over 40 years old, and around half (51 percent) are between 20 and 40 years old. Standards



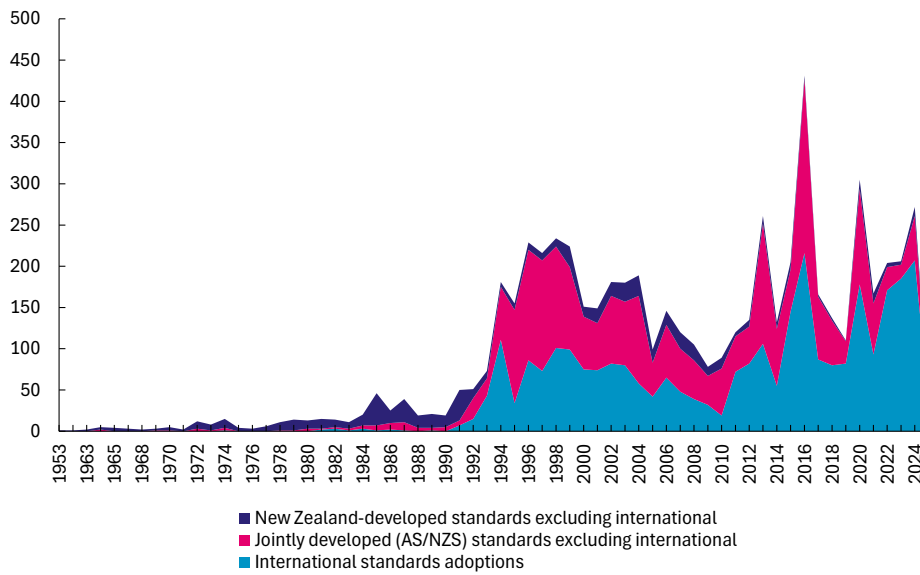
between 10 and 20 years old make up 28 percent of the available standards, while the remaining 5 percent are under 10 years old.

Figure 2 Standards NZ available standards



Source: NZIER from Standards New Zealand

Figure 3 Standards by publication year



Note: Excludes standards with no listed publication date in the Standards NZ datasets.

Source: NZIER from Standards New Zealand



A.5 How are standards funded

Standards New Zealand operates primarily on a cost-recovery funding model, as mandated by the Standards and Accreditation Act 2015. This means funding comes through from the sale of standards and the development or revision of standards. Examples of funding include:

- Individual retail sales of standards
- Subscription to the online library
- Sponsorship (pre-funded access) of standards
- Licensing of standards content
- Development of new or revisions of standards
- Royalties from New Zealand secretariat standard sales overseas.

A.5.1 Standards development

Standards New Zealand plays a central role in shaping the country's technical and quality infrastructure by leading the development, updating, and adoption of standards across a wide range of sectors. This process is not only technical – it is a collaborative participatory mechanism that brings together expertise from industry, regulators, consumers, professional associations and academia.

There are three main pathways through which standards are produced in New Zealand:

- New Zealand-developed standards – designed in response to domestic needs, these standards are initiated and shaped by local stakeholders to address national regulatory, operational, or safety requirements.
- Joint standards with Australia – developed in partnership with Standards Australia, these standards reflect the economic integration of the Trans-Tasman market and aim to reduce trade barriers, lower compliance costs, and increase regulatory consistency.
- Adopted international standards – these are drawn from global organisations such as the International Organisation for Standardisation (ISO) or the International Electrotechnical Commission (IEC). Their adoption ensures New Zealand industries stay aligned with international best practices, enabling smoother trade and interoperability.

Each standard follows a rigorous development process that reflects internationally recognised principles – transparency, balance, consensus and due process. This involves early-stage stakeholder engagement, formation of expert committees, public consultation phases, and approval by an independent governance board. The result is a standard that is not only technically sound but also enjoys broad sectoral legitimacy and relevance.

This approach enables Standards New Zealand to balance responsiveness to local needs with alignment to global developments, ensuring that the standards system supports both domestic resilience and international competitiveness.



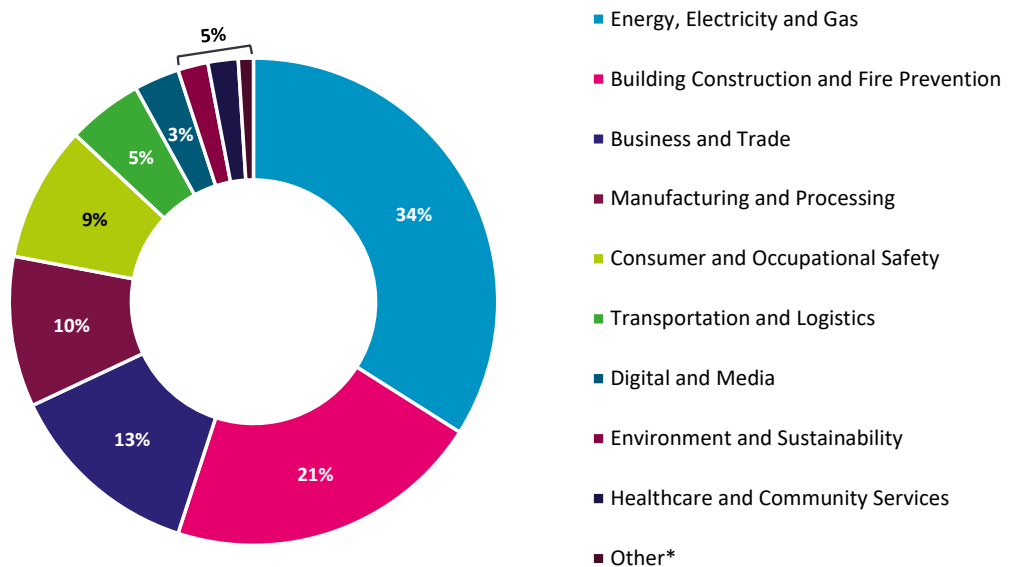
A.5.2 International participation

Standards New Zealand participates in international standards development and collaborates with global standards organisations, which grants access to globally recognised guidelines and enables the sharing of expertise. This international engagement ensures alignment with best practices and fosters international recognition of standards in New Zealand. Standards New Zealand is also New Zealand’s representative in the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

A.5.3 Sale and access to standards

Standards New Zealand is responsible for publishing and distributing standards, including those developed domestically, jointly with Australia, or adopted from international standards bodies. These publications ensure accessibility for all users, providing current, superseded, and withdrawn standards. As shown in Figure 4, 34 percent of standards are in the Energy, Electricity, and Gas sector, while 21 percent are for standards related to Building Construction and Fire Prevention. Examining access events⁸ shown in Figure 5, 71 percent of these were for standards in the building and construction sector. The higher representation of access is likely driven by the fact that many building standards are freely accessible to the public.

Figure 4 Standards offered by sector



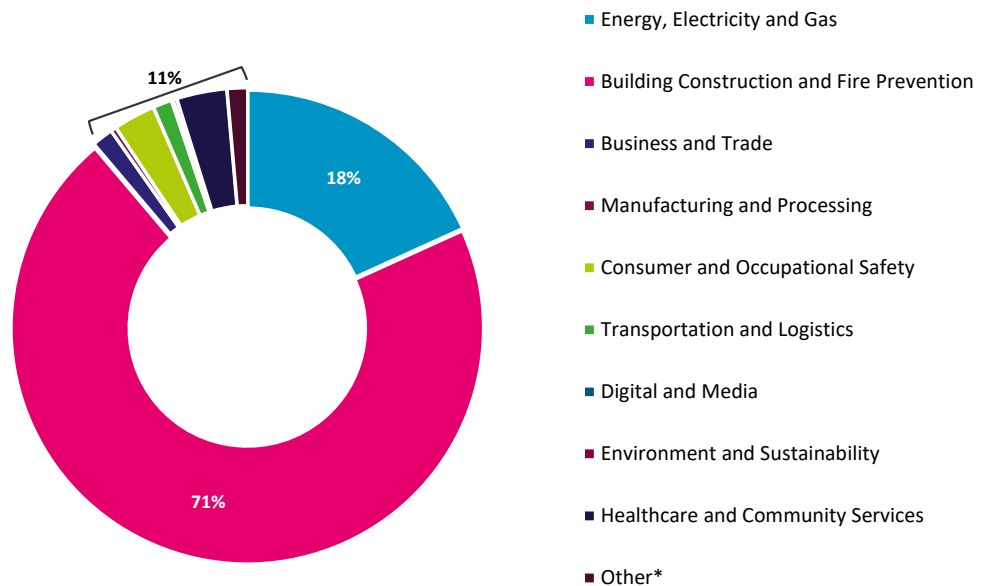
* Other includes local government, education and training, and all other categories.

Source: Standards New Zealand

⁸ An access event is each time a standard is accessed by a Standards NZ customer.



Figure 5 Access events by industry sector



* Other includes local government, education and training, and all other categories.

Source: Standards New Zealand

A.6 The standards development process

Standards New Zealand operates under a ‘user-pays’ funding model, where revenue is primarily derived from two sources:

- Sales of access to standards, whether developed domestically, jointly with Australia, or adopted internationally.
- Commissioning fees are paid by organisations or businesses that request the development, review, or adoption of specific standards (Standards New Zealand 2024).

This approach reflects the principle that those who benefit from a standard should contribute to its cost. However, it also creates some structural constraints – particularly in sectors with limited resources or in areas where public interest outcomes outweigh direct commercial benefits.

A.6.1 The development pathway

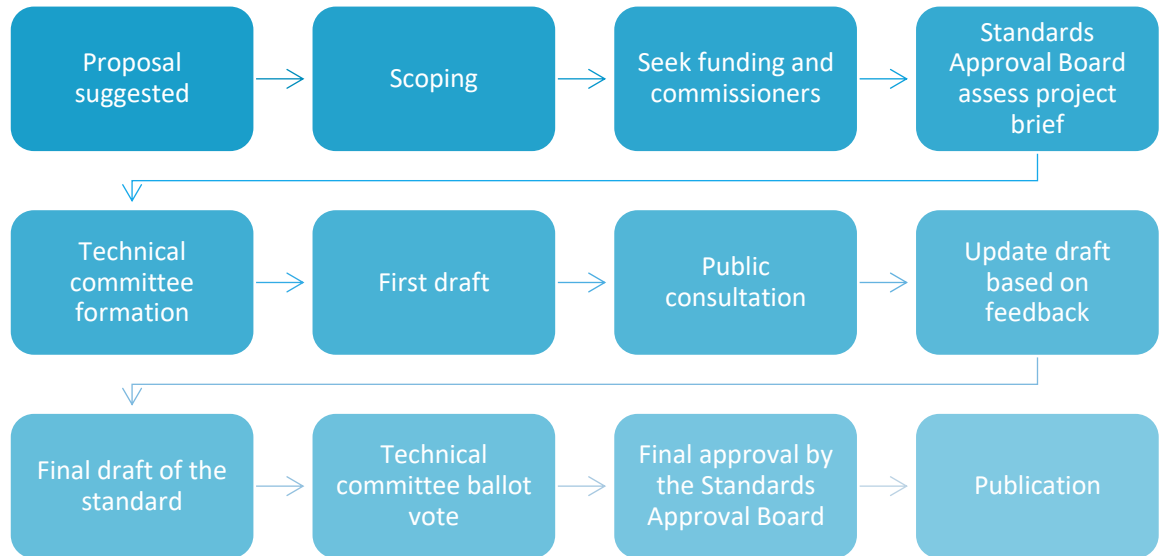
Anyone in New Zealand – whether an industry group, government agency, or community organisation – can propose a new standard or revision. The process begins with the submission of a commissioning brief outlining the rationale, scope, and expected impact of the proposed standard. The process is set out in Figure 6.

If the proposal is approved, a technical committee is established, typically composed of a diverse group of stakeholders with relevant expertise or interest. The committee works collaboratively to draft the standard, which is then published for public consultation. Feedback from this process is incorporated into a revised draft. A final vote is conducted by the committee, after which the proposed standard is submitted to the Standards Approval



Board for formal approval. Once approved, the standard is published and made available for use.

Figure 6 New Zealand standards development process



Source: NZIER from Standards New Zealand (2023)

A.6.2 Volunteer reliance and system constraints

A defining feature of New Zealand’s standards development model is its heavy reliance on voluntary contributions. Standards New Zealand (2024) suggests that while this ensures a level of grassroots and technical engagement, it also exposes the system to several persistent challenges:

- Expert retention – it can be difficult to source and maintain industry expertise over time, especially in high-demand or niche technical areas.
- Representation gaps – those who can afford to volunteer are often from large businesses, skewing input toward well-resourced perspectives and larger enterprises.
- Underrepresentation of users – consumer and community voices, including those of smaller businesses or marginalised groups, are often absent due to resource constraints.
- Participation costs – volunteers bear costs related to time, travel, and attendance, which are not typically reimbursed, limiting capacity, accessibility and diversity.

These challenges raise important questions about the long-term sustainability, inclusivity, and equity of the current model, particularly as standards become increasingly integral to public policy, safety, innovation, productivity, trade, and economic resilience.



A.7 How we differ from other countries

A.7.1 Singapore

Enterprise Singapore and the Singapore Standards System

Enterprise Singapore is the national agency responsible for overseeing and facilitating the development of standards in Singapore, acting on proposals primarily initiated by industry and government stakeholders. Unlike New Zealand's user-pays model, the agency is predominantly publicly funded, receiving SGD279.3 million (NZD362.9 million) in operating grants in the 2024 financial year. Additional revenue of SGD13.1 million (NZD17.0 million) was generated through other sources, such as service fees and project-based contributions (Enterprise Singapore 2024).

Standards development process

The process for developing standards in Singapore shares many similarities with that in New Zealand. Standards are proposed in response to specific issues identified by the government or industry, and once a proposal is accepted, it undergoes a public comment phase of one month.

Following this, a working group is established under the relevant Standards Committee, which is tasked with drafting the standard or a technical reference. The drafting period typically ranges from six months to three years, depending on the complexity of the issue. Where relevant, international standards are reviewed and considered for direct adoption or adaptation, ensuring alignment with global best practice and avoiding duplication of effort. Once the draft is complete, it is released for a second round of public consultation, this time for two months, after which the final draft is submitted for approval by the Standards Committee.

Emphasis on problem definition and outcome tracking

A distinguishing feature of the Singaporean approach is its emphasis on clearly defining the problem and expected benefits at the proposal stage. Proposers must articulate:

- The specific issue or market gap the standard is intended to address
- The expected users of the standard
- The anticipated benefits, both qualitative and quantitative, across user groups and the wider industry.

This structured proposal serves as the basis for a post-implementation review, typically conducted one to two years after publication. At this point, key users identified during the proposal stage are interviewed to assess the extent of adoption and the realised impact on operations. This feedback loop not only supports accountability and continuous improvement but also helps to verify whether the intended value of the standard has materialised in practice.



A.7.2 Australia

Standards Australia is a private, not-for-profit company

Standards Australia Ltd is the country's key organisation in the country's standards infrastructure, including the development of Australian standards. Unlike New Zealand and Singapore, Standards Australia is a non-government membership-based company registered with the Australian Charities and Not-for-profits Commission (Standards Australia 2024).

Their direct revenue comes from publication sales, royalties from distribution partners, projects, grants and returns generated by the Future Fund investment portfolio. Royalties made up just under three-quarters of their operating revenue. Standards Australia's total operating revenue for 2024 was AUD53.7 million (NZD57.9 million).

The process of developing standards in Australia is similar to that of Singapore and New Zealand, with some differences. A proposal is submitted by a member of the Australian community. It then goes into a prioritisation and selection process and, if approved, is assigned to a technical committee.

Working groups then provide technical support in the writing of the standard, which is then published for public comment. The technical committee then votes on the final draft of the standard, and any negative votes must be accompanied by technical substantiation.

Standards Australia and the net benefit requirement

A defining feature of the Australian standards development process is its formal emphasis on demonstrating a net community benefit before a proposal can proceed. This requirement ensures that the value of a proposed standard outweighs its potential costs to industry, consumers, and society.⁹

Proposers must prepare a net benefit case that addresses several dimensions, including:

- Public health and safety – how the standard improves well-being and whether it is the most effective solution
- Social and community outcomes – including intangible benefits and effects on vulnerable groups
- Environmental impact – such as reductions in pollution, noise, or improved sustainability
- Competition and innovation – how the standard affects market openness, interoperability, and technological advancement
- Economic impact – assessing cost savings, productivity changes, and distributional effects across sectors.

Standards Australia provides technical guidance to help proposers construct these cases, making explicit the trade-offs and expected impacts. Only proposals that can credibly demonstrate a net benefit are progressed to the development stage.

⁹ <https://www.standards.org.au/documents/guide-to-net-benefit-gu-103>



This framework supports transparent prioritisation of standards, encourages evidence-based decision-making, and aligns the standards system with national policy objectives. While there is no formal post-implementation review mechanism akin to Singapore’s, the up-front rigour of the net benefit case provides a strong accountability mechanism for both proposers and standards committees.

Table 10 shows the criteria to be considered under the net benefit case.

Table 10 Standards Australia summary and demonstration of net benefit criteria

| Category | Criteria |
|-----------------------------|---|
| Public health and safety | <ul style="list-style-type: none"> Describe how the Standard will improve public and/or workplace health or safety. Demonstrate that the Standard is the most appropriate method to improve health or safety. Summarise the overall health and safety impact of the Standard. |
| Social and community impact | <ul style="list-style-type: none"> Consider the social and community impact of the Standard, including ‘intangible’ costs and benefits borne by different sectors of the community, including the most vulnerable consumers or end users (such as better information, improvements to products and services, and more reliable outcomes). Summarise the overall social and community impact of the Standard. |
| Environmental impact | <ul style="list-style-type: none"> Consider the environmental impact of the Standard, including ‘intangible’ costs and benefits (e.g. noise, pollution, amenity). Summarise the overall environmental impact of the Standard. |
| Competition | <ul style="list-style-type: none"> Describe how the Standard enables international alignment in global markets. Identify potential competition restrictions or improvements that may result from the Standard. Identify potential impacts upon innovation. Detail how the Standard can enable the most widely used technology and/or supports international interoperability (demonstrate if applicable). Summarise the overall impacts on competition. |
| Economic impact | <ul style="list-style-type: none"> Consider the economic impact of the Standard over its life on different sectors of the community, such as consumers, manufacturers, small business, suppliers, etc. Detail the impacts, which may include elements such as increased/decreased costs, increased/reduced utility, redistribution of wealth, inequitable impacts across or between sectors, inequitable impacts on the most vulnerable consumers or end users, employment, economic growth or contraction, and productivity outcomes. Summarise the overall economic impact on the community. |

Source: Standards Australia (2022)

A.8 Who we interviewed

As part of this research, we interviewed key agencies that use standards. These included:

- WorkSafeNZ
- BusinessNZ
- Building Research Association of New Zealand (BRANZ)



- Building Officials Institute of New Zealand (BOINZ)
- Master Plumbers
- Master Builders
- Standards Australia
- Engineering NZ
- Standards Singapore
- New Zealand Standards Approval Board
- National President International Electrotechnical Commission New Zealand.



Appendix B CGE modelling

B.1 How do they work?

A CGE model consists of equations which describe model variables. It also uses detailed data on the structure of the economy that is consistent with these model equations. This data provides a snapshot of the economy in a particular year, which is used as a starting point for a baseline (or business as usual (BAU)) against which to compare policy simulations or economic changes.

The model data is linked together through a set of equations which capture how the economy evolves over time in response to a shock. These equations, which are based on the economic theory of general equilibrium, ensure supply and demand for goods, services and factors of production in the economy are balanced and determine how firms and households react in response to changes in incentives.

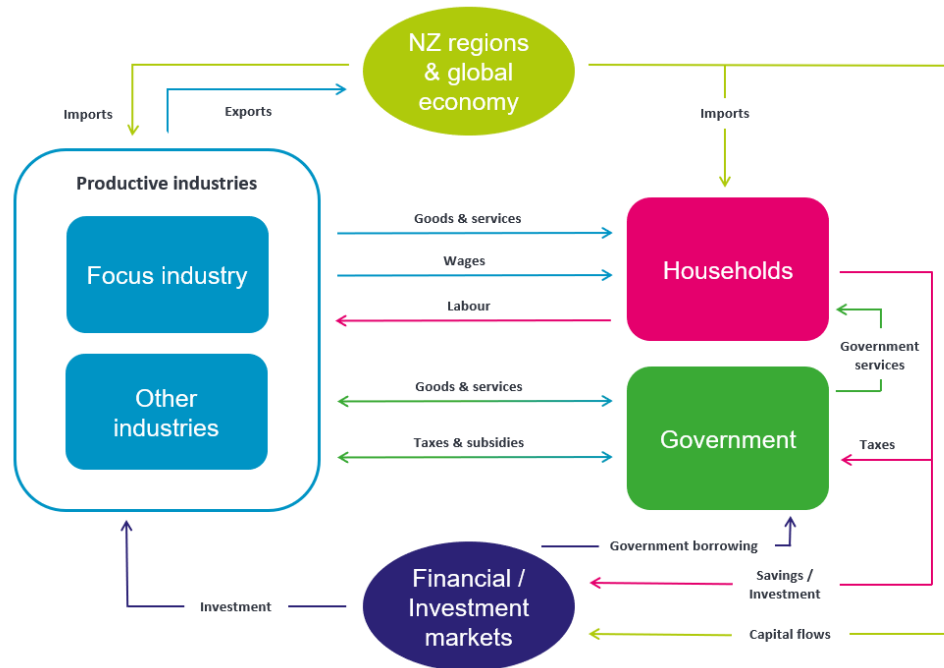
In any CGE model, we must choose what is to be determined within the model (the endogenous variables) and what is to be considered external to the model (the exogenous variables). A CGE model is just a way of explaining the endogenous variables in terms of the exogenous variables.

Where we draw the line between endogenous and exogenous variables and which ones can vary or have to remain fixed depends on a number of factors, including the purpose for which the model simulations are to be used. The choice that we make is called the model closure. Determining the closure is a key part of any modelling exercise, and it is very important that the modeller be transparent about what the result of the modelling is and what has been imposed by assumption via the closure.

The difference between the initial and the new equilibrium can then be analysed to determine the effect of the shock on a range of economic indicators, such as GDP, employment, wages and living standards. Figure 7 provides a stylistic representation of the relationships between different parts of the model.



Figure 7 Our CGE model represents the circular flows in the economy



Source: NZIER

B.2 How do we shock the model?

To reach the different scenario outcomes, we must ‘shock’ the model to generate changes in national and regional economies. When we shock the model, we select specific input parameters and change their values. The change in some input parameter values produces further changes throughout the economy.

Resources are reallocated to reflect changing conditions. These changes result in increases or decreases in the industries in the model, leading to increases or decreases in commodities produced. There are flow-on effects to markets and supply chains. The model tries to find a mathematical solution that shows how the economy would resettle into a steady state given the new input parameter value.

We can then examine the changes by industry and region or at the national level. We can also compare changes across scenarios to look for differences in how the economy reacts to various shocks.

B.3 What are our closure conditions?

CGE models require researchers to make a few assumptions about how the economy operates. Essentially, there are too many moving parts for the amount of economic data we have, so we have to nail down a few of those parts to allow the model to find a solution. These assumptions are called *closure conditions*. They typically concern labour markets, capital markets, government behaviour, and foreign exchange.

Determining the closure is a key part of any modelling exercise and it is very important that the modeller be transparent about what is a result of the modelling and what has been imposed by assumption via the closure. We investigated several sets of closure conditions to select one in which the model behaved in a way that reflected medium-term



adjustments in the economy: enough flexibility to represent the choices and changes that businesses and consumers might make, but with some constraints on their options.

The closure conditions used for this modelling are that:

- Aggregate employment is fixed but the real wage varies, so that changes in the macroeconomy have an impact on the average household
- Capital is flexible but the rate of return is fixed, which provides investment capital for changes in business activities as long as the changes are sufficiently profitable
- Real government consumption follows household consumption, so that government spending is constant as a percentage of the whole economy.

