

STUDY REPORT

SR 317 (2014)

Potential measures of productivity and performance at the firm, grouped firm and regional level

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Jointly funded by:



and



**Ministry of Business,
Innovation & Employment**

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Acknowledgments

This work was jointly funded by the Building Research Levy and the Ministry of Business, Innovation and Employment.

We acknowledge the assistance of Statistics New Zealand in completing this study.

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1. EXECUTIVE SUMMARY

The contention of earlier work by BRANZ is that traditional **technical measures of productivity**, while valuable for comparing industries and compiling national GDP estimates, are of little meaning or use to the individual firm. There are also a number of factors



influencing technical productivity estimates over which the individual firm has no control, such as the boom-bust cycle or how accurately productivity is measured.

Instead, the business owner is most concerned **with firm performance** although running a business well is likely to improve productivity in the technical sense. Firm performance is most easily understood and measured in terms of **financial** results. Yet to achieve good financial results, a firm needs to employ well-trained human resources, keep clients happy and obtain repeat business, and develop and maintain quality processes for dealing with suppliers, clients and employees. These **less easily measured factors** are crucial to the financial performance of the firm, and thus to the productivity of the industry.

The international literature identifies more than 40 potential measures of firm performance. The vast bulk of **these measures could apply to any industry**, making them more broadly useful for monitoring and improving business performance (and as a result, technical productivity) across New Zealand. More than a dozen (mostly financial) benchmark measures can be monitored using currently collected data. A further nine measures can be measured for some sub-sectors or for larger firms. Unfortunately, **around two dozen** mostly non-financial **measures do not currently have meaningful benchmarks** in New Zealand. Many of these measures will be valuable, and will require clearer definition and more subjective assessment.

We propose four actions to make existing benchmarks available and to develop a more complete set of benchmarks for monitoring and improving performance:

- **Collect and publish existing benchmark data in one place** on an annual basis so that, in the shortest possible time, firms will have a set of benchmarks against which to compare their performance and act to improve areas of weakness.
- **Build a Business Process Use index** that will be valuable in understanding the prevalence of formal processes for business processes across firm of different sizes and sub-sectors. This will help explain how sophisticated (or otherwise) firms are in their approach to business processes relative to their peers or larger businesses
- **Conduct an annual survey to fill in the substantial gaps** in performance measure benchmarks. This survey should focus only on measures that are most meaningful to the industry, and that are genuine contenders to be adopted by businesses in monitoring their own performance against benchmarks.
- **Compare New Zealand benchmarks to international comparisons** to set best practice targets for the industry based on what is done well internationally.

2. INTRODUCTION

The contention of earlier work by BRANZ is that traditional **technical** measures of productivity, while valuable for comparing industries and compiling national GDP estimates, are of little meaning or use to the individual firm. There are also a number of factors influencing technical productivity estimates over which the individual firm has no control, such as the boom-bust cycle or how accurately productivity is measured.

Traditional technical measures of productivity are of little meaning or use to the individual firm. Instead, the business owner is most concerned with firm performance.

Although running a business well improve productivity in the technical sense (by boosting profitability or output per unit of input through efficiency), the business owner is most concerned **with firm performance**, or even individual project performance. Given this reality, this study contends that our focus should be on what individual firms can control, measure and compare – their own performance.

2.1 Why a focus on technical productivity may be flawed

A BRANZ report (Norman and Page, 2014) sets out in some detail the current official measures of productivity, and the poor performance of the construction sector across those measures.¹

It is worth repeating some of the key points from that study, particularly with regard to the factors that affect official measures of productivity. Some of the reasons explored for poor productivity growth across official measures includes:

- **Failure to pass on price increases:** Overall, prices the industry charges for its outputs have risen more slowly than what it is charged for its inputs.
- **What we build:** The New Zealand construction industry is built on residential construction, which is subject to large fluctuations in demand, and has lower labour productivity than other sub-sectors.
- **How the industry responds to demand:** Construction businesses hoard workers during downturns, leading to sharp declines in productivity, with the opposite true in upturns. Small businesses, which often don't benefit from the productivity improvements that come with scale and are less resilient to economic hardship, tend to proliferate during boom years and fail in bust years.
- **Uncertainty over workloads:** The industry has lacked the certainty of workload to invest in people, plant and technology, which improves how efficiently work can be done.
- **Labour efficiency:** Over time, labour should be better able to employ capital, management and skills to increase output per hour worked in real terms (i.e. an increase in multi-factor productivity), but this has not been the case in construction.

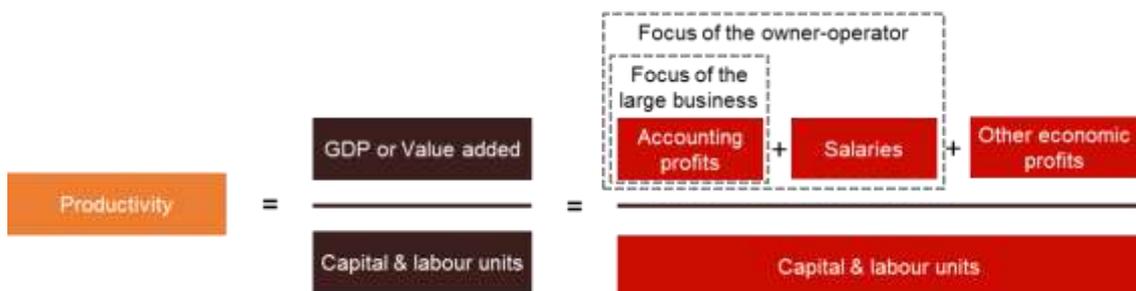
¹ Page, I; and Norman, D. (2014). *Measuring construction industry productivity and performance*. BRANZ.

- **Measurement of quality, capital and labour units:** Accurately excluding changes in quality from estimates of construction industry price increases is challenging, and if not successfully done, will lead to an underestimate of real GDP (and therefore productivity) growth. Similarly, measuring the number of capital units accurately is hard.²

Individual businesses have **limited if any control over some of these factors**, such as the boom-bust cycle and how productivity is measured. Further, technical definitions of productivity are far removed from the daily operations of the individual business. Bearing these facts in mind, the earlier BRANZ report made the argument that businesses do not prioritise productivity in the technical sense (units of output divided by units of input).

Instead, as Figure 1 highlights, the individual firm exists primarily to **maximise value for its shareholders**, which in many cases, may only be the individual builder or trades person. Value in the eye of the shareholder may at times be less about the profitability of the business *per se*, and more about what that profitability means in terms of lifestyle or options for the future. Nevertheless, without profitability in an accounting sense, value for the shareholder cannot be maximised.

Figure 1 There is a clear relationship between profits, GDP and productivity



Business owners often refer to aspects of productivity in their business, but they almost never mean productivity in the technical sense as used in official measures. What they usually mean is how well their business uses its resources (people and capital) to produce profits for the business (and in the case of the owner-operator, to generate an ongoing personal income stream). This report refers to this as **performance**, because maximising profits and ensuring ongoing viability of a business is its main objective.

Maximising profitability (increasing performance) is directly linked to productivity in that it is part of GDP, somewhat simplistically presented here as accounting profits, salaries, and other economic profits (mostly depreciation). As the figure shows, by growing accounting profits and salaries, we are by definition increasing the numerator of the productivity equation, and therefore

By growing accounting profits and salaries through better firm performance, we are by definition increasing the numerator of the productivity equation, and therefore increasing productivity itself.

² Since publication of the BRANZ report, commentators have raised other reasons why productivity gains may not have been realised in official statistics. These include the dominance of the labour-only model, where builders pass on materials costs plus margins, and charge their time as their main source of revenue. This approach limits incentive to improve materials procurement processes.

productivity itself. However, **productivity in the technical sense in and of itself is not the goal for the business.**

2.2 From productivity to performance

The questions therefore change from “How can we boost productivity (in the technical sense)?” to:

- How can we boost performance?
- How can we monitor and benchmark performance so firms can improve on areas of weakness?

A way to graphically show the link between performance and productivity is set out in Figure 2.

Figure 2 There is a direct link between firm performance and technical productivity



Monitoring and performance improvement that makes the firm more efficient (i.e. it uses fewer inputs for the same output, or produces more output from the same inputs) or more profitable **by definition** also improves technical productivity of that firm (as technical productivity is the sum of profits and salaries), and by extension, the industry and national economy. Similarly, improving performance customer satisfaction that leads to a good reputation and repeat business will increase the likelihood of that business remaining profitable, which once again **by definition** means a contribution toward GDP (and productivity).

Our previous work provided a number of examples of performance measures that could be adopted by the individual firm, many of which already have regularly published benchmarks against which to compare their performance. These measures cover a number of factors such as:

- Profitability
- Return on assets / investment
- Repeat business through customer satisfaction
- Staff retention
- Innovation and new technologies.

A basket of potential measures is set out in Figure 3, which also highlights whether or not benchmarking is already available for each measure.

Figure 3 There are several easily-monitored performance measures at the firm level

Measure name	How to measure this	Industry benchmarking available?
Financial measures		
Solvency	Current assets / current liabilities; greater than 1.0 needed	
Profitability	Gross, taxable or net profit / turnover	Yes
Return on Assets	Taxable or net profit / net assets	Yes
Customer satisfaction		
Formal written feedback from client	Qualitative, basic survey questionnaire may help	Yes
Call back rate	% of jobs requiring a call-back	Yes
Fixing of defects	hours required, \$ of labour costs	
Repeat clients	% of annual work value or jobs that is repeat business	
Staff retention		
Worker turnover rate or average tenure	Average years in job per worker, (joiners + leavers) / average staff level	Yes
Job turnover rate	Jobs disestablished / jobs filled at start of year	Yes
Innovation		
Innovation spend	% of turnover	
New management tools / processes	Qualitative assessment of changes	
Prefabrication	% of value of work put in place	Yes

BRANZ

Many of these measures already have benchmarking available at the sub-sector level, and often even the firm-size level, to allow individual firms to consider their outcomes relative to their peers, as well as to established rules of thumb around profitability and the like.

2.3 Scope of this work

Leading on from the analysis in our previous work, this study aims to:

- Investigate what measures of productivity and performance are used at the firm level **internationally** (building on previous work where possible)
- Identify what data sources are already available in New Zealand, with a particular focus on data sources such as the Longitudinal Business Database (LBD) and how these can be accessed and used
- Evaluate and recommend how existing data sources in New Zealand could be better used to monitor performance and productivity at the firm, grouped firm and regional level
- Highlight gaps in current data collection (if any) and suggest ways these gaps may be overcome.

3. FIRM LEVEL PERFORMANCE AND BENCHMARKING

The literature on firm performance measures **in general** is vast. Similarly, the literature on **project-level** performance measures for the construction industry is significant, but studies on **firm-level** performance measures for the construction industry is more limited, and tends to use relatively generic performance measures. While this lack of measures unique to the construction industry can be seen as a failing, the generic nature of construction industry performance measures increases the likelihood that Statistics New Zealand and other broad data collectors may already be collecting data that can be used for the construction industry.

3.1 Selecting good performance measures

Performance Measures must be:

- simple to operate
- simple to understand
- simple to action.

A UK report (2000) points out that clients of the construction industry want their projects delivered:³

- on time
- on budget
- free from defects
- efficiently
- right first time
- safely
- by profitable companies that will not disappear overnight.

In addition, regular clients expect **continuous improvement** from their construction team to achieve year-on-year including reductions in project costs and reductions in project times. The UK study suggests that performance measures should target these outcomes desired by clients.

3.2 Pitfalls of measuring performance

There are a number of pitfalls to be avoided when measuring performance:

- As Kaplan and Norton (1992), and Luu et al (2008) point out, **only considering financial measures** (especially a single focus on return on investment) rather than customer satisfaction and other factors is short-sighted. Putting short-term profitability ahead of building a satisfied client base in what is a long-term business is likely to have disastrous firm-viability effects in the long-run. Some commentators suggest that the financial measures in the BSC should be around 50% of total evaluation; others suggest this figure should be as low as one-third.

³ Department for the Environment, Transport and the Regions. (2000). *KPI report for the Minister for construction*.

- Only measuring KPIs and **not benchmarking** these KPIs against what other firms of the same size, same sub-sector, or in the same region are achieving makes measurement far less meaningful (see Deng et al 2013).⁴

Ramírez et al (2003) point out that benchmarking is “an important continuous improvement tool that enables companies to enhance their performance by identifying, adapting and implementing the best practice identified within a participating group of companies”.⁵ And as Costa et al (2006) point out, benchmarking is what allows businesses to identify firms that do better than them across particular indicators, to learn from them, to establish improvement targets and to promote change within their organisations.⁶

Similarly, Ali et al (2013), in a meta-analysis of the various studies on performance indicators at the project and firm-level, point out that benchmarking must accompany performance measurement to improve efficiency and effectiveness.⁷

For instance, some New Zealand building firms undertake their own customer satisfaction surveys, but these do not allow for benchmarking against their competitors. BRANZ data suggests that most residential building projects score quite well across most indicators, which means relative performance becomes a matter of a fraction of a point. This means a firm measuring its own performance only, and achieving an overall client satisfaction ratio of 4 out of 5 may think it is doing well, but the industry average may be 4.2, making it a sub-par performer. But without a consistent benchmarking approach, there is no way for firms to know this.

Performance measurement must consider more than financial measures, benchmark against comparators, focus on the firm and not just one project, and take into account exogenous factors such as firm size and geographic location.

Indeed, numerous benchmarking programmes have been used at some point or another internationally. Bakens et al (2005) provide a summary of 25 such benchmarking programmes used in Europe, the United States, Australia and Asia.⁸ Yet reviewing these systems as part of our current work suggests many of them are no longer used, or have been surpassed.

⁴ Deng, F; Smyth, H; and Anvuur, A. (2013). *Effects of PMS Process Quality in Construction Firms*. Engineering Project Organization Conference, Colorado, 9-11 July 2013.

⁵ Ramírez, R; Alarcón, C; and Knights, P. (2003). *Benchmarking management practices in the construction industry*. Proc., 11th International Group for Lean Construction Conference.

⁶ Costa, D; Formoso, C; Kagioglou, M; Alarcón, L; and Caldas, C. (2006). *Benchmarking initiatives in the construction industry: Lessons learned and improvement opportunities*. Journal of Management in Engineering, 22:4, pp158-167.

⁷ Ali, HAEM; Al-Sulaihi, IA; and Al-Gahtani, KS. (2013). *Indicators for measuring performance of building construction companies in Kingdom of Saudi Arabia*. Journal of King Saud University – Engineering Sciences, 25, pp.125-134.

⁸ Bakens, W; Vries, O; and Courtney, R. (2005). *International review of benchmarking in construction*. PSIBouw.

This lack of continuity in some benchmarking initiatives is a stumbling block to improvements in the industry. In New Zealand, it is important that a meaningful framework for comparison is developed and maintained, allowing firms to evaluate their performance against their peers on an ongoing basis.

- **Focusing on the project, rather than the firm.** A further challenge with most of the benchmarking systems Bakens et al (2005) highlight (see also Ali et al, 2013), and others considered as part of our study, is that they or act as a governmental means of selecting preferred suppliers for regular projects. Many don't measure ongoing, overall firm performance, and they don't provide much insight into **why** a firm's outputs and outcomes are poor. For instance, a firm may regularly fail to deliver a project on time, but whether this is a supplier management, staff management, process management or some other problem cannot be determined from an outcomes-focused measurement and benchmarking framework. We consider this point in more detail later when we highlight the contributions of Luu et al (2008) and Yu et al (2007).
- As Horta et al (2012) point out, there are a **number of exogenous factors** such as firm size, geographic location, economic context that **must be factored** into any performance measurement and benchmarking comparison.⁹ Data will not always be available to allow disaggregation by firm size or geographic location, but when a firm considers its own performance, it needs to be able to allow for its specific context in evaluating how well it is doing. For example, a firm based in Auckland is likely to have a higher labour productivity than elsewhere, is likely to be larger, and may therefore also benefit from economies of scale.

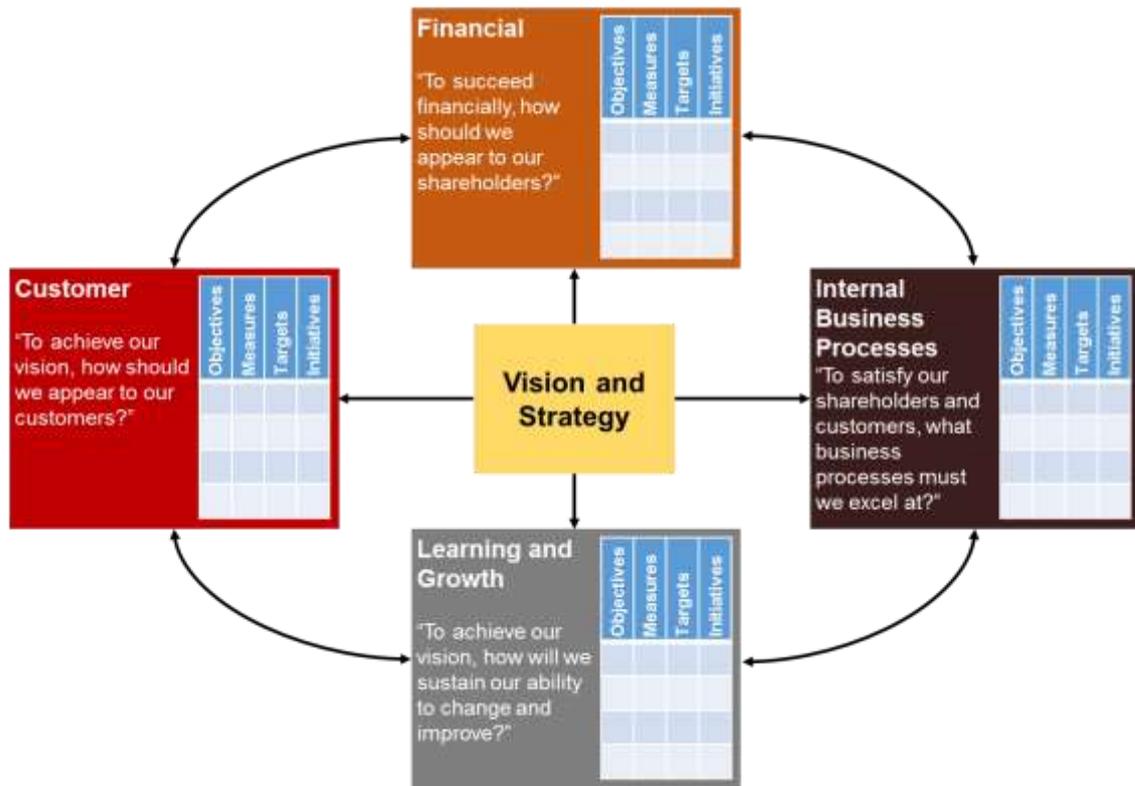
3.3 Introducing the Balanced Scorecard (BSC) and its derivatives

Kaplan and Norton (1992) proposed a BSC for measuring performance at the firm level.¹⁰ Documenting this BSC approach was a landmark moment within the field of performance measurement. The point of the BSC was that far more than just financial measures need to be considered when considering the performance of a firm. The BSC approach is summarised in Figure 4.

⁹ Horta, I; Camanho, A; and Cosat, J. (2012). Performance assessment of construction companies: A study of factors promoting financial soundness and innovation in the industry. *International Journal of Production Economics*, doi:10.1016/j.ijpe.2012.01.015.

¹⁰ Kaplan, R; and Norton, D. (1992). *The balanced scorecard: Measures that drive performance*. *Harv. Bus. Rev.* 70 (1), 71–79.

Figure 4 The Balanced Scorecard focuses on more than just financial performance



The thrust of the BSC is that financial measures provide a picture of the **past**, while the other three dimensions of the BSC focus on **future** performance, by looking at factors that are likely to affect the ability of the firm to do better in future (such as customer satisfaction, which may lead to repeat business).

In a later publication, Norton and Kaplan (1996) provide detail on the types of generic measures that might be captured in each of the four perspectives, as highlighted in Figure 5.¹¹

Figure 5 Norton and Kaplan highlight typical measures across four perspectives

MEASURING BUSINESS STRATEGY	
Perspective	Generic Measures
Financial	Return on investment and economic value-added
Customer	Satisfaction, retention, market, and account share
Internal	Quality, response time, cost, and new product introductions
Learning and Growth	Employee satisfaction and information system availability

¹¹ Kaplan, R; and Norton, D. (1996). *The balanced scorecard: Translating strategy into action*.

Many of these measures have already been highlighted in previous BRANZ work, but the Norton and Kaplan work, and other studies considered in this report, add to these.¹²

Several authors build on the work of Norton and Kaplan by:

- Adjusting their BSC to include more than four perspectives (e.g. Jin et al, 2013¹³)
- Assigning weightings to each of the four perspectives (e.g. Yu et al, 2007¹⁴)
- Suggesting appropriate measures for each of the perspectives (e.g. Yu et al, 2007, Luu et al, 2008¹⁵).

Yet the BSC has achieved mixed results, as Jin et al (2013) point out. Various studies have shown use of the BSC to have limited impact on a firm's performance, including financial performance. Nevertheless, as Jin et al) argue, the BSC has brought the debate of what matters for firm performance to the fore, acknowledging that it is not just about financial performance. Further, other studies cited by Jin et al have shown other strengths of the BSC, including that it:

- Integrates four important performance perspectives into one management report
- Highlights causality, making performance management more of a feed-forward control system
- Allows for better strategy control
- Contains both the outcome dimensions and the driver of the outcome dimensions.

3.4 Recent work on construction performance measures and frameworks

As already mentioned, several studies have added to the work of Kaplan and Norton by suggesting specific measures or additional performance perspectives. Other studies have taken a completely different tack, developing their own sets of measures. This section provides a summary of some of the key studies and the measures they identify.

Jin et al (2013), whose work has already been described in part, have a list of 36 indicators for construction firms operating internationally, many of which are applicable to smaller, local firms as well. Some of these are additional to those in the earlier BRANZ work (see Figure 3) and include:

- growth rate of revenue
- local market share
- social responsibility
- supply chain management
- employee satisfaction
- brain drain

¹² Page, I; and Norman, D. (as yet unpublished). *Measuring construction industry productivity and performance*.

¹³ Jin, Z; Deng, F; Li, H; and Skitmore, M. (2013). *Practical framework for measuring performance of international construction firms*. *Journal of Construction Engineering and Management*, 139(9), pp. 1154-1167.

¹⁴ Yu, I; Kim, K; Jung, Y; and Chin, S. (2007). *Comparable performance measurement system for construction companies*. *Journal of Management In Engineering*, July 2007, pp.131-139.

¹⁵ Luu, T;Kim, S; Cao, H; and Park, Y. (2008). *Performance measurement of construction firms in developing countries*. *Construction Management and Economics*, 26:4, pp. 373-386.

- investment in training.

It is immediately obvious that many of these are softer, less easily measured performance measures. For instance, social responsibility is hard to define, much less measure. Nevertheless, difficulty in measurement is not a reason to exclude the measure from a list of factors that should be considered when evaluating firm performance. Surveys or interviews may be required to sufficiently understand how firms perform on some of these indicators, if more quantitative measures cannot be found.

Even as Kaplan and Norton's 1992 work started the conversation for performance measurement more generally across industries, perhaps the seminal work within the construction industry is that by the UK Department for the Environment, Transport and the Regions (DETR) in 2000.¹⁶ While the focus of this report was very much on measuring performance on a **project** basis, many of the measures introduced can be measured and benchmarked on a **firm by firm** basis.

Measures introduced by the DETR work that could be monitored by individual firms and benchmarked more broadly include:

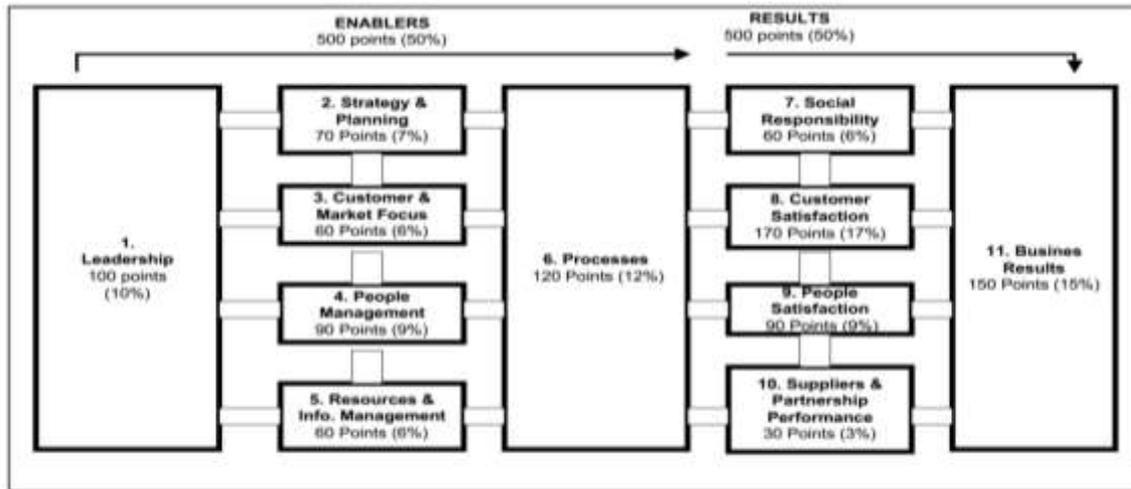
- **time predictability across design and construction:** change between actual design and construction time and pre-estimated design and construction time, as a percentage of pre-estimated design and construction time
- **time to rectify defects:** average number of weeks between the end of the contract period and the conclusion of defect remediation
- **cost predictability of design and construction:** change between actual design and construction cost and pre-estimated design and construction cost, as a percentage of pre-estimated design and construction cost
- **change orders:** The number of individual change orders approved by project manager due to design or construction errors or adjustments.
- **repeat business:** the value of repeat business expressed as a percentage of turnover
- **reportable accidents:** reportable accidents per 10,000 hours worked.

Constructing Excellence New Zealand has been developing benchmarking data for a number of these indicators over the last several years, against which individual firms are able to monitor their performance on a project basis.

Another framework cited in the literature is the South African Construction Excellence Model (SACEM), set out in 2002. It allows for monitoring of performance at the construction site and firm level, and is based on the framework set out in Figure 6.

¹⁶ Department for the Environment, Transport and the Regions. (2000). *KPI report for the Minister for construction*.

Figure 6 The SACEM allows performance measures to be summed for an overall score



The SACEM adds to the answer of how to measure performance in a couple of ways. First, it adds a number of other dimensions to the framework of factors affecting overall performance, such as social responsibility, people and resource management, and the leadership of the firm. Second, it allows for the creation of an overall index, using weightings to create a score out of 1,000.

The SACEM uses a 0-3 scaled questionnaire using multiple questions to cover the 11 dimensions. Specific performance areas that the SACEM adds to the studies already identified in this review include:

- **Leadership:** how the behaviour and actions of the executive team and all other leaders inspire, support and promote a culture of business excellence
- **Strategy and planning:** how management formulates, deploys, reviews and turns policy and strategy into plans and actions
- **Resources and information management:** how the firm manages and uses resources and information effectively and efficiently
- **Business processes:** how the firm uses resources and information to support its plans. Business processes forms an important area of study in business management and improvement
- **Impact on society:** what the firm achieves in satisfying its local community and society.
- **Suppliers and partnership performance:** what the firm achieves with its supplier and partner processes and relationships. This aspect of performance is assessed by measuring the firm's perception of its suppliers' and partners' performance and other additional measures relating to the performance of the organisation's suppliers and partners.

One criticism of the SACEM approach is that it is largely a self-assessment approach, and many of the factors measured may be hard for firms to be objective about. It also makes no allowance for benchmarking, other than against a perfect score of 1,000.

Luu et al (2008) include additional dimensions that attempt to incorporate management factors into an evaluation of performance.¹⁷ These dimensions offer a number of other potential measures to consider:

- Material management
- Change management
- Team performance
- Quality management.

Once again, the challenge with Luu et al's approach is that it relies on a 5-point survey for each of these four dimensions to determine the performance of the firm (or individual project). For example, questions on team performance ask the person filling in the form to score how well management supports the project team, and the degree of teamwork among members. These types of questions make it harder to fairly benchmark across firms as the score of the individual firm may be influenced by the single person filling in the survey form at that firm.

It may be possible to develop more objective measures for some of these dimensions. For instance, a more objective measure of how well inventories are managed might be the **absolute** time between purchasing materials and being reimbursed by the client (i.e. both a long lead time or a long lag time would yield a high score, with a low score being better). Similarly, quality management may be measured to some extent through defects measurement.

Ramírez et al (2003) attempted to introduce benchmarking for a number of management practices, again relying on surveys.¹⁸ But the point of departure for their study was to **correlate** these management practices (such as planning and programming, or sub-contractor management) with more objective, traditional measures of performance. So for instance, they found a correlation of -0.374 between sub-contractor management and the rate of risk (days lost due to worker injury).

This study may help explain the link between measurable outcomes (accident rates, on-time delivery, labour productivity etc.) and management practices (planning, sub-contractor management etc.) that are harder to objectively measure. If management practices can be explained in terms of measurable outcomes, it may not be necessary to measure the more subjective management practices themselves on a regular ongoing basis.

If management practices can be explained in terms of measurable outcomes, it may not be necessary to measure the more subjective management practices themselves on a regular ongoing basis.

¹⁷ Luu, V; Kim, S; and Huynh, T. (2008), *Improving project management performance of large contractors using benchmarking approach*. International Journal of Project Management 26 (2008) pp. 758–769.

¹⁸ Ramírez, R; Alarcón, C; and Knights, P. (2003). *Benchmarking management practices in the construction industry*. . Proc., 11th International Group for Lean Construction Conference.

Other performance measures highlighted by various studies include:

- **Downtime:** Actual hours worked across projects in a year / hours budgeted
- **Degree of sub-contracting:** Sub-contractor payments / turnover
- **Economic value added (EVA):** After-tax operating profit less the cost of capital, which measures how much economic value is being created by what a company does with its assets¹⁹
- **Inventory turnover:** calculated as monthly or annual sales divided by inventory on hand, this measure targets better use of inventory, meaning less money is tied up in materials not being used
- **Leverage test:** similar to the liquidity test, this ratio measures all debts divided by all assets, for a picture of the overall leverage of the organisation
- **Cost reduction:** Is a firm able to reduce costs per unit of work (such as cost per square metre for house build prices) as it improves the efficiency with which it works (Kaplan & Norton, 1996)
- **Revenue growth rates:** Is the firm growing its revenues, and how does its growth compare with its peers?

In another 2008 study by Luu et al, further factors are highlighted including:²⁰

- Proportion of tenders / quotes that are successful (volume and dollar measures)
- Investment in equipment and technology as a share of turnover
- Percentage growth in profits
- Marketing expenditure as a share of turnover.

These factors are measurable, and provide insights into some of the more strategic decisions made by firms (such as to spend on marketing or new capital).

Yu et al (2007) also focus on the less obvious factors at play in a firm that operates well. Yet unlike many of the other studies focusing on management practices, they were able to suggest ways to quantify some factors without relying on surveys. Some (slightly modified) measures they highlighted included:

- **Technological capability:** Intellectual property rights of the construction firm, measured as patents, industrial design rights, and copyrights
- **Business efficiency:** General and administrative expenses as a share of turnover
- **HR development:** Share of employees receiving formal training in a given year.

3.5 Literature review: A summary

This study has highlighted a number of key pieces of work that have attempted, with mixed success, to quantify far more than just the financial indicators of firm performance. While some indicators, or proxies for them, can be inferred from data that is available at

¹⁹ Robbins, S; Bergman, R; Stagg, I; Coulter, M. (2006). *Management*, 4th edition. Pearson Prentice Hall.

²⁰ Luu, V; Kim, S; Cao, H; and Park, Y. (2008). *Performance measurement of construction firms in developing countries*. *Construction Management and Economics*, 26:4, pp. 373-386.

the firm level and is possibly already collected at an industry level, there are other indicators that may only be benchmarked through survey or interview work.

Figure 7 summarises the list of performance measures identified through previous work by BRANZ and through this literature review. The following chapter discusses which of these measures could be benchmarked using the Longitudinal Business Database (LBD).

Figure 7 The wide range of potential financial and non-financial performance measures

Measure name	How to measure this
Financial	
Solvency	Current assets / current liabilities; greater than 1.0 needed
Profitability	Gross, taxable or net profit / turnover
Return on Assets	Taxable or net profit / net assets
Revenue growth	% change in revenue over previous year
Profit growth	% change in profits over previous year
Economic value added	After tax operating profit - the cost of capital / turnover
Inventory turnover	Annual cost of goods sold / inventory on hand
Leverage test	All debts / all assets
Bad debts	% of turnover
Cost of defects	Hours required OR \$ of labour costs OR cost as % of contract value
Customer	
Formal written feedback from client	Qualitative, basic survey questionnaire
Call back rate	% of jobs requiring a call-back
Market share	% of total sales in the region for this sub-sector
Time predictability across design and construction	Change in actual time / estimated time OR % of work delivered on time
Cost predictability of design and construction	Change in actual cost / estimated cost
Fixing of defects	Average days after practical completion to complete
Repeat clients	% of annual work value (or projects) that is repeat business
Social responsibility	Qualitative assessment
Internal business processes	
Business efficiency	General and administrative expenses as % of turnover
Degree of sub-contracting	Sub-contractor payments / turnover
Worker turnover rate or average tenure	Average years in job per worker, (joiners + leavers) / average staff level
Job turnover rate	Jobs disestablished / jobs filled at start of year
Brain drain	Skills analysis (average qualifications per worker)
Reportable accidents	Reportable accidents per 10,000 hours worked
Downtime	Actual hours worked across projects in a year / hours budgeted
New management tools / processes	Qualitative assessment of changes
Supply chain management	Qualitative assessment
Employee satisfaction	Qualitative assessment
Change orders	Number of individual change orders due to design or construction errors or adjustments
Leadership	How the executive team and other leaders support and promote a culture of business excellence
Strategy and planning	How management formulates, deploys, reviews and turns policy and strategy into plans and actions
Resources and information management	How the firm manages and uses resources and information effectively and efficiently
Impact on society	What the firm achieves in satisfying its local community and society
Inventory management	Lag between buying materials and being reimbursed by client (absolute value)
Change management	Qualitative assessment
Quality measurement	Use defects measures as proxies
Cost reduction	Cost per unit of work (e.g. per square metre of housing put in place)
Proportion of tenders / quotes that are successful	% of quotes accepted (by volume and dollars)
Share of turnover from competitive tenders / quotes	% of work from tenders / quotes rather than direct appointments
Marketing focus	% expenditure as a % of turnover
Supplier (sub-contractor) performance	
Learning and growth	
Innovation / R&D spend	% of turnover OR spend per worker
Prefabrication	% of value of work put in place
Investment in training	% of turnover OR % of workers receiving training
Technological capability	Value of Intellectual property rights , measured as patents, industrial design rights, and copyrights - could use "Intangibles" as a proxy
Investment in equipment and technology	% of turnover
HR development	% of staff receiving formal training each year

4. THE LONGITUDINAL BUSINESS DATABASE

The Longitudinal Business Database (LBD) is a linked longitudinal dataset that covers a range of business information. It encompasses a collection of several surveys and databases that collect data at the firm level.

Based on discussions with Statistics New Zealand and our own evaluation of its constituent datasets, the key data sources within the LBD that are expected to yield the most valuable data for the purposes of benchmarking performance in the construction industry are likely to be:

- The Annual Enterprise Survey (AES)
- The IRD's Tax-filed Financial Accounts (IR10).
- Linked Employer Employee Data (LEED)
- The Business Operations Survey (BOS)

We explore these data sources in greater detail below and highlight their potential uses in monitoring firm performance.

4.1 The Annual Enterprise Survey

The AES provides annual information on financial performance and financial position for industries in New Zealand. It covers all economically significant businesses, which together contribute approximately 90 percent of New Zealand's GDP. As a survey (not a census) around 16,000 businesses are covered, representing a population of around 450,000 businesses. The survey is **full coverage for large firms**, and **stratified sample survey for smaller firms**.

AES data is available for cross-tabulations of:

- the **four sub-sectors** of Residential, Non-residential, Heavy and civil engineering construction, and Construction services by
- **firm size** groupings.

4.1.1 Best way to use AES data

AES data can be applied to benchmarking and performance in the following ways:

- Market share (share of total income generated by sub-sector of particular firm size)
- Solvency
- Profitability
- Return on assets
- Revenue growth
- Profit growth
- Inventory turnover
- Leverage test.

AES and IR10 data can be used to monitor firm performance across a number of predominantly financial measures.

AES data is used to capture the financial information for predominantly larger firms, and should be used in conjunction with the IR10 data (see below) which is used to supplement information for smaller firms.

4.2 Tax-filed Financial Accounts

The IR10 provides a range of financial information at the individual firm level, acting as a simplified profit and loss statement and balance sheet. It is not compulsory for businesses to complete this form, but Statistics New Zealand does have access to the data that is collected. Because AES data is sampled for small businesses, the IR10 data provides a useful alternative / additional data source.

IR10 data is available for cross-tabulations of:

- the **four sub-sectors** of Residential, Non-residential, Heavy and civil engineering construction, and Construction services by
- **firm size** groupings.

4.2.1 Best way to use the IR10 data

This data can be aggregated for different firm sizes and industry sub-sectors. Its uses are similar to that of the AES data, but with a few additions:

- Market share (share of total income generated by sub-sector of particular firm size)
- Solvency
- Profitability
- Return on assets
- Revenue growth
- Profit growth
- Inventory turnover
- Leverage test
- Bad debts
- Economic value added
- Business efficiency
- Degree of sub-contracting
- Innovation / R&D spend
- Technological capability.

4.3 Linked Employer Employee Data

LEED can be used to provide a number of benchmarks against which to measure individual firm performance. **Quarterly** LEED includes measures of:

- Job creation and destruction rates (job stability)
- Worker turnover rates (worker retention).

This quarterly data is available at an eight sub-sector level, which allows comparison of rates at a **disaggregated** level.

Annual LEED can be used to monitor worker length of tenure (worker retention)

There are some limitations on how LEED can be used, however. Specifically:

LEED provides worker turnover and job destruction rates at a limited number of sub-sector and firm size levels.

- **Data tends to be at least 15 to 18 months old.** For instance, as at 29 January 2014, only data for September 2012 was available. This makes the data less relevant when dramatic changes happen in an industry, such as the possible impacts on construction of the Canterbury earthquakes.
- **Cross-tabulations are typically not available at a detailed level.** For instance, if we only want to look at worker turnover rates, we can monitor changes for eight construction sub-sectors over the last 14 years. However, we cannot also view changes in each sub-sector by firm-size. Instead, we can only look at changes in worker turnover rates by firm size for the construction industry overall, **or** for sub-sectors. If we wanted to look at an even more detailed breakdown, such as firm size by region, we would be limited to 11 aggregated regions (probably not a problem) and an aggregated *Mining; Electricity, gas and water; and Construction industry* (more of a problem in providing meaningful benchmarks).
- **Worker length of tenure data** is only available on an **annual basis** and only at the construction industry level.

4.3.1 Best way to use LEED

LEED is likely to be most useful **considering sub-sector trends** in worker turnover rates, and job creation and destruction rates individually, or in looking at **regional or firm-size differences in the construction industry as a whole.**

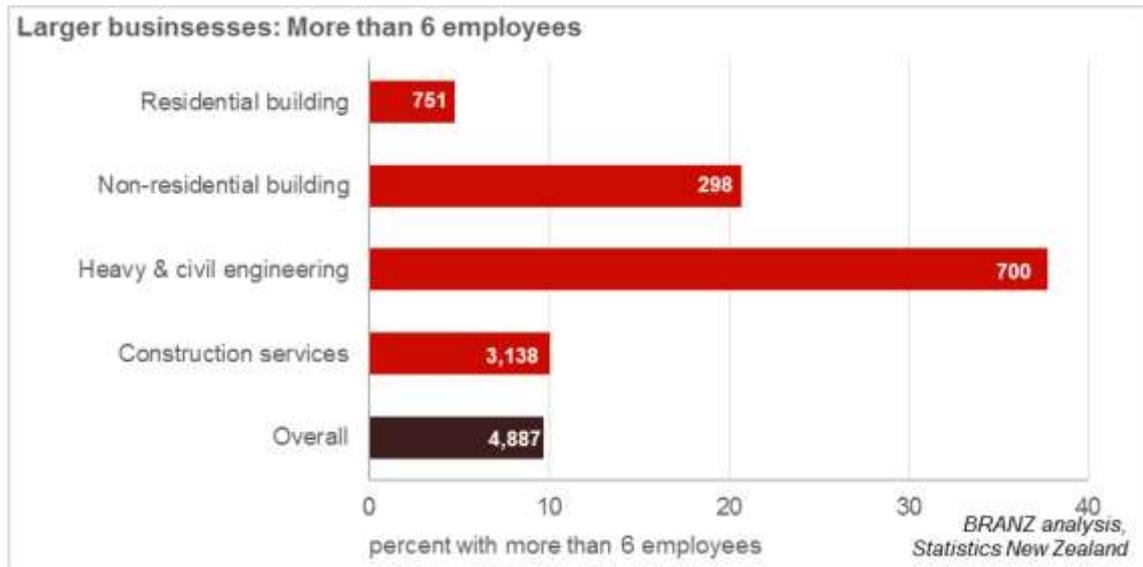
Annual worker tenure data can only be used as a very broad measure of the ability of the industry overall to keep people.

Further disaggregation across the cross-tabulations is not possible.

4.4 Business Operations Survey

The BOS is a collection of survey data related to firm behaviour and performance. It is a representative sample (sample size of approximately 7,000) for around 35,000 businesses that have a rolling mean employment of **at least six people**. This means that it does not provide direct coverage of around 90% of all businesses in the construction industry, as highlighted in Figure 8.

Figure 8 BOS provides benchmarking for fewer than 10% of construction businesses



While nearly 40% of businesses in Heavy and civil engineering have at least six employees, only around 5% of Residential building businesses have at least six employees. Thus while the BOS may be relatively representative for the Heavy and civil engineering sub-sector, it will be far less so for the Residential building sub-sector, even though as Figure 8 shows, there are more than 750 Residential building businesses with six or more employees.

Nevertheless, the BOS has the potential to provide some useful benchmarking information. Given that the Construction industry data is among the most complete in the survey (representing around 10.4% of businesses covered by the survey), our discussions with Statistics New Zealand have indicated that data is available by the four main sub-sectors (Residential, Non-residential, Heavy and Civil, and Construction trade services), cross-tabulated with the business sizes 6 to 19, 20 to 49, and 50-plus employees. Alternatively, data could be provided separately for the four sub-sectors and for four business sizes (6 to 19, 20 to 49, 50 to 99, and 100-plus employees).

One further limitation of the BOS is that many of the most useful questions on business practices are covered in the third of its three modules (Module C). Module C is open to competitive bidding between government agencies, and as a result, the topic of business practices has only been covered in 2005 and 2009.²¹ The 2009 data offers a good starting point for analysing how well the construction (or any other) industry is already undertaking certain business practices, but there would be significant benefit in Module C being used for

Limitations of the BOS include that it is undertaken only with larger businesses, and that many of the most useful questions on business practices are covered in the irregular Business Practices module.

²¹ Fabling, R. (2009). *A rough guide to New Zealand's Longitudinal Business Database*. Research Unit for Statistical and Empirical Analysis in Social Sciences.

business practices on a more regular basis, which may require involvement from MBIE or other government agencies.

In its current form, the annual BOS data (Module A) can be used to help understand:

- **Employment occupational groups (proxy for skill levels):** Percentage of workers employed as Managers, Technicians, Tradespersons or Others.
- **Major competitor comparison (measures of awareness of peers):** Whether costs, time to complete, quality, flexibility, customer satisfaction, or employee satisfaction were lower, better or on par with competitors.
- **Perceived performance relative to competitors:** Whether businesses believe they are performing better, worse or on par with their competitors.
- **Delivery performance:** Percentage of goods or services from this business delivered on time and to customer requirements.

Module B alternates focus on innovation and ICT in alternate years. The Innovation questionnaire covers questions with relevance to business performance measurement, including:

- **Businesses with innovation activity:** Share of businesses implementing innovation activities defined as “the development or introduction of any new or significantly improved activity for this business. This includes products, processes and methods that this business was the first to develop and those that have been adopted from other organisations”.²²
- **Type of innovation activity:** Innovation related to goods and services; operational processes; organisational or managerial processes; or marketing.
- **Innovation expenditure per employee.**

The 2009 Module C has several questions that can be used to **support benchmarking** for individual businesses, or that at very least **provide insights into business practices** as they relate to monitoring performance. These include:

- **Goal development:** Does the business have a formal goal development process?
- **Mission statement:** Does the business have a mission statement?
- **Business planning horizon:** How long-term does the business plan to achieve its goals?
- **Internal communications:** Has the firm communicated its goals, plans, major changes and potential improvements with employees at some point in the last financial year?
- **Dealing with customer complaints:** Does the firm have set procedures for dealing with customer complaints?
- **Measuring customer satisfaction:** How frequently does the business measure customer satisfaction (never, less often than once a year, once a year, twice a year, more often than twice a year)?

²² Statistics New Zealand. (2009). *Business Operations Survey 2009*.

- **Supplier quality measurement:** Does the firm have a system for measuring the quality of goods and services from its suppliers?
- **Supplier-firm processes:** Is the firm working to improve these processes?
- **Focus of current performance measurement:** To what extent does the firm focus on financial, cost, operational, quality, innovation, or human resource performance measurements?
- **Structured benchmarking:** Who, if any, does the firm compare itself to (businesses in the same industry in New Zealand, businesses in a different industry in New Zealand etc.)
- **Employee satisfaction:** For what proportion of employees does the firm monitor satisfaction?
- **Training prevalence:** What proportion of workers received training in the last financial year?
- **Training type:** What types of training were offered in the last year (management, customer service, computer, other)?

4.4.1 Best way to use the BOS

It is important to remember that the BOS data is **only for larger firms** (more than six workers), but it can help provide targets even for smaller firms to aim at.

Most of the questions in Module B tend to relatively generic, beginning with the definition of innovation, which makes it hard to draw too many conclusions from the Module. **More useful information is likely to come from Modules A and C**, when the latter is included in the survey.

Yet even Module C in most cases **stops short of evaluating how well** businesses perform in specific areas of management. For instance, while Module C asks businesses **if** they are working to improve supplier-firm processes, or **if** they have a system for monitoring supplier performance, it does not ask for an evaluation of whether those systems are working. While the survey determines if construction businesses check on the level of employee satisfaction, they do not identify what that level of employee satisfaction is across different business sizes or sub-sectors.

Many of the questions in the Business Practices Module ask if businesses monitor various facets of their operations but stop short of evaluating how well they operate across each facet.

The particular questions the BOS is most likely to be useful for are:

- **Skill levels:** Percentage of workers employed as Managers, Technicians, Tradespersons or Others (Module A, annual)
- **Delivery performance:** Percentage of goods or services from this business delivered on time and to customer requirements (Module A, annual)
- **Innovation expenditure per employee** (Module B, every two years)
- **Training prevalence:** Proportion of workers receiving training in the last financial year (Module C, ad-hoc).

This information can be extracted for cross-tabulations of firm size (grouped above six people) by four construction sub-sectors.

It may be possible to build a **composite index** focusing on “Use of business processes” that captures a range of information from Module C under the broader heading of the extent to which the business uses formal processes and monitoring. This index will not explain how well businesses are performing, but will at least highlight the fact that they **have formal processes in place** for things like business planning, goal setting, internal communications, customer communication, supplier management, performance measurement, and customer and employee satisfaction.

To maximise benefit from the BOS, two things will be required:

- **More regular use of the Business Practices version of Module C**, possibly updated to better capture actual measures of business performance and focus (such as percentage of turnover spent on marketing, lag between inventory purchase and reimbursement etc.) to provide meaningful trend data against which firms can benchmark
- **Support of government agencies such as MBIE**. Access to LBD datasets is available only to government agencies or those seconded by government agencies to undertake the work.

5. GAPS AND OPPORTUNITIES

Figure 9 shows the performance-productivity hierarchy. Improved productivity in the technical sense (units of production divided by units of input such as labour and capital) at an industry level is a goal for practically every industry. However, as argued previously, the individual firm is most concerned with firm performance.

Figure 9 From firm performance to technical productivity: a hierarchy



This firm performance is most easily understood and measured in terms of financial results. Yet for a firm to achieve good financial results, it needs to use well-trained human resources effectively, keep clients happy and obtain repeat business, and develop and maintain quality processes for dealing with suppliers, clients and employees. These factors (represented by the orange part of the triangle in Figure 9), despite being less-easily quantified or measured, are crucial to the financial performance of the firm, and thus to the productivity of the industry.

Wherever possible, we should select the most meaningful measures of these customer, internal business process, and learning and growth measures, and develop ways to measure them.

The preceding analysis of the international literature and of data available through the LBD suggests four actions to develop the benchmarking needed to help firms in the industry monitor their performance relative to their peers, and to act where a need for improvement is needed.

5.1 The existing gap in performance measurement

Figure 10 (overleaf) repeats the list of performance measures identified in the existing literature, and where exact or proxy measures already exist to measure performance across these dimensions in New Zealand. The green-amber-red coding system means:

- **Green:** Good measures already exist (although in some cases they may not be easily accessible without accessing data stored by another agency)

Figure 10 Gaps in existing performance measurement

Measure name	How to measure this	Industry benchmarking available?	Source	Exact / proxy	Level of detail for benchmarking
Financial					
Solvency	Current assets / current liabilities: greater than 1.0 needed	Yes	AES / IR10	Exact	4-sector by firm size
Profitability	Gross, taxable or net profit / turnover	Yes	AES / IR10	Exact	4-sector by firm size
Return on Assets	Taxable or net profit / net assets	Yes	AES / IR10	Exact	4-sector by firm size
Revenue growth	% change in revenue over previous year	Yes	AES / IR10	Exact	4-sector by firm size
Profit growth	% change in profits over previous year	Yes	AES / IR10	Exact	4-sector by firm size
Economic value added	After tax operating profit - the cost of capital / turnover	Yes	AES / IR10	Exact	4-sector by firm size
Inventory turnover	Annual cost of goods sold / inventory on hand	Yes	AES / IR10	Exact	4-sector by firm size
Leverage test	All debts / all assets	Yes	AES / IR10	Exact	4-sector by firm size
Bad debts	% of turnover	Yes	AES / IR10	Exact	4-sector by firm size
Cost of defects	Hours required OR \$ of labour costs OR cost as % of contract value	No			
Customer					
Formal written feedback from client	Qualitative, basic survey questionnaire	Yes	Existing BRANZ survey	Exact	Regional for Residential sub-sector
Call back rate	% of jobs requiring a call-back	Yes	Existing BRANZ survey	Exact	Regional for Residential sub-sector
Market share	% of total sales in the region for this sub-sector	Yes	AES / IR10	Exact	4-sector by firm size but no regional breakdown
Time predictability across design and construction	Change in actual time / estimated time OR % of work delivered on time	Yes (6+ people)	BOS Module A	Proxy	4-sector by firm size over 6 people
Cost predictability of design and construction	Change in actual cost / estimated cost	Yes	Constructing Excellence Survey	Proxy	Non-residential and Civil sub-sectors only
Fixing of defects	Average days after practical completion to complete	No			
Repeat clients	% of annual work value (or projects) that is repeat business	No			
Social responsibility	Qualitative assessment	No			
Internal business processes					
Business efficiency	General and administrative expenses as % of turnover	Yes	AES / IR13	Proxy	4-sector by firm size
Degree of sub-contracting	Sub-contractor payments / turnover	Yes	AES / IR10	Exact	4-sector by firm size
Worker turnover rate or average tenure	Average years in job per worker, (joiners + leavers) / average staff level	Yes	LEED	Exact	8 sub-sectors OR firm sizes OR regions;
Job turnover rate	Jobs disestablished / jobs filled at start of year	Yes	LEED	Exact	8 sub-sectors OR firm sizes OR regions;
Brain drain	Skills analysis (average qualifications per worker)	Yes (6+ people)	BOS Module A	Proxy	4-sector by firm size over 6 people
Reportable accidents	Reportable accidents per 10,000 hours worked	Yes	Accident Compensation Corporation / Statistics New Zealand	Proxy	ACC data on accidents by industry divided by Statistics New Zealand estimates of hours worked by industry
Downtime	Actual hours worked across projects in a year / hours budgeted	Yes	Existing BRANZ survey	Exact	Limited survey of residential builders provides benchmark
New management tools / processes	Qualitative assessment of changes	No			
Supply chain management	Qualitative assessment	No			
Employee satisfaction	Qualitative assessment	No			
Change orders	Number of individual change orders due to design or construction errors or adjustments	No			
Leadership	How the executive team and other leaders support and promote a culture of business excellence	No			
Strategy and planning	How management formulates, deploys, reviews and turns policy and strategy into plans and actions	No			
Resources and information management	How the firm manages and uses resources and information effectively and efficiently	No			
Impact on society	What the firm achieves in satisfying its local community and society	No			
Inventory management	Lag between buying materials and being reimbursed by client (absolute value)	No			
Change management	Qualitative assessment	No			
Quality measurement	Use defects measures as proxies	No			
Cost reduction	Cost per unit of work (e.g. per square metre of housing put in place)	No			
Proportion of tenders / quotes that are successful	% of quotes accepted (by volume and dollars)	No			
Share of turnover from competitive tenders / quotes	% of work from tenders / quotes rather than direct appointments	No			
Marketing focus	% expenditure as a % of turnover	No			
Supplier (sub-contractor) performance		No			
Learning and growth					
Innovation / R&D spend	% of turnover OR spend per worker	Yes	AES / IR10 OR BOS Module B	Exact	4-sector by firm size OR 4-sector by firm size over 6 people
Prefabrication	% of value of work put in place	Yes	Existing BRANZ survey	Exact	Regional for Residential and Non-residential sub-sectors
Investment in training	% of turnover OR % of workers receiving training	Yes (6+ people)	BOS Module C	Exact	4-sector by firm size over 6 people
Technological capability	Value of Intellectual property rights , measured as patents, industrial design rights, and copyrights - could use "Intangibles" as a proxy	Yes	AES / IR10	Proxy	4-sector by firm size
Investment in equipment and technology	% of turnover	No			
HR development	% of staff receiving formal training each year	No			

- **Amber:** Performance measures exist for some sub-sectors and/or some firm sizes, and some assistance in accessing data may be required
- **Red:** No known meaningful proxy or exact measure is available in New Zealand.

This summary, our analysis of international literature and our investigation into the LBD indicate at least four actions that should be taken to:

- Create meaningful benchmarks against which firms can monitor their performance and act to improve outcomes
- Better understand how various firm sizes and sub-sectors perform, so appropriate policy, education and advice can be given to the industry to improve performance, ultimately targeted at improving industry performance and productivity.

We discuss these four actions in the sections that follow.

5.2 Collect and publish existing benchmark data on a regular basis

The first action is to **produce an annual set of benchmarks** that gather and use existing data to make performance measures immediately available so that industry can begin to use these measures to improve performance.

The annual report would begin by using all the data sets coded green or amber in Figure 10. If/as better quality data become available (e.g. amber-coded measures are developed to such an extent that they are re-coded green, or data sets are developed for red-coded measures), they would be incorporated in the annual reports.

BRANZ would be the logical organisation to **take the lead** on publishing these benchmarks. **Authorization to gain access** to the Statistics New Zealand data would likely be **required from MBIE** or another government agency. Funding would also need to be secured.

Existing data should be assembled as quickly as practical into a set of benchmarks made available to the industry so that firms can begin to monitor their relative performance.

One way to further improve the quality of this benchmarking process relatively easily would be for the appropriate government agencies to work closely with Statistics New Zealand to **ensure Module C of the BOS more regularly focuses on business practices**. We also propose a review of the questions asked in the Business Practices Module C to frame some questions in a way that better allows for benchmarking (i.e. that go beyond if a business uses a certain process, to **how well** it performs on that process).

5.3 Build a Business Process Use index

We propose that a **Business Process Use Index be developed** using the BOS data to understand the prevalence of business practices across firms. **Businesses will be able to estimate their own score** on the Index to understand how sophisticated their approach to business processes is relative to their peers or larger businesses.

As highlighted earlier in this report, Modules B and C (Business Practices) of the BOS cover a number of questions that determine if businesses have any formal processes for improving supply chain management, measuring employee and customer satisfaction,

introducing change, setting business goals and the like. While these questions do not gauge how well businesses undertake these processes, they do provide an indication of how structured an approach businesses of different sizes take to business processes.

There is value in understanding the prevalence of formal processes for business processes across firm of different sizes and sub-sectors.

Developing the Index will **require authorization from MBIE** or another government organisation. Once again, we **propose a review of Module C** (Business Practices) to ensure the usefulness of the data collected is maximised, and that the Business Practices module is regularly administered.

5.4 Conduct annual surveys that fill in the gaps

Figure 10 shows that a large number of potentially useful performance measures have no exact or proxy measures in New Zealand. We believe that there is merit in monitoring trends in many of these measures for the purposes of understanding how the industry is changing, and crucially to provide useful benchmarks for firms, so they can monitor and improve their performance.

BRANZ already undertakes numerous surveys of the construction industry. We recommend the development of a **firm performance survey that targets specific gaps** in the understanding of how firms perform across a range of factors such as employee satisfaction, leadership, change management and the like as listed in Figure 10. Ideally this survey should be of a **scale and breadth that allows disaggregation** of benchmarking measures into three or four industry sub-sectors and across firm sizes.

There is a lack of meaningful customer, internal business process, and learning and growth measures. An annual survey should be introduced to monitor how firms are performing on these crucial performance factors.

We suggest **working with MBIE and industry representatives** (the Registered Master Builders Federation, Certified Builders Association of New Zealand, Construction Strategy Group etc.) to identify which of these performance measures that are not currently measured are:

- Most meaningful to the industry
- Genuine contenders to be adopted by businesses in monitoring their own performance against benchmarks.

This discussion would **narrow the focus of the proposed additional surveys** to measures that, if **benchmarked and promoted to the industry**, are likely to have the biggest impact on firm performance.

As a starter for discussions, we recommend the following measures:

- Cost and time to fix defects
- Average project time and cost predictability
- Business efficiency
- Process and supply chain management
- Change management approach to variations

- Leadership development and quality
- Employee satisfaction
- Staff training.

These measures would be added to the crucial financial and other measures we are already able to benchmark and that are fundamental to the success of construction businesses.

The biggest challenge is going to be showing business owners that there is value in monitoring and improving on these measures in a way that increases the profitability of their business and helps keep the business viable.

5.5 Compare New Zealand results to international comparisons

The actions set out above would facilitate the development of meaningful benchmarks for businesses of different sizes and sub-sectors against which to evaluate their own performance and to act to improve where necessary.

However, these benchmarks will not answer the question of how New Zealand firms compare to their counterparts in other countries. Thus, while benchmarks will provide targets for businesses to improve in areas in which they perform poorly, the industry will still lack an understanding of how far New Zealand may be from industry best practice.

A study comparing how the construction industry performs in comparator nations would give firms that are already performing well by New Zealand standards **a best practice set of benchmarks to aim for.**

6. APPENDIX A: GLOSSARY

- **Acid Test Ratio:** A test of whether a firm has enough short-term assets to cover its short-term liabilities. Cash plus accounts receivable plus short term investments all divided by current liabilities.
- **Capital productivity:** Total production (GDP) divided by capital units.
- **Capital units:** An estimation of the standardised number of units of capital used by an industry that is calculated by weighting the efficiency of various asset types used in that industry.
- **Current liabilities:** A firm's debts that are due soon (usually within one year). Current liabilities include short term loans, accounts payable, and accrued liabilities.
- **Current ratio:** A measure of whether a firm has enough short-term assets to cover its short-term liabilities. Current assets including stock divided by current liabilities
- **GDP (Gross Domestic Product):** The value of all the final goods and services produced in an industry or country within a given period (usually a year).
- **GFCF (Gross Fixed Capital Formation):** The value of new capital (buildings, plant, equipment and the like) put in place within a geographic area within a certain time (usually a year).
- **Gross profit:** Turnover less cost of sales
- **Gross profit margin:** Expressed in percentage terms, this measures gross profits (before tax, overheads, payroll or interest payments) divided by turnover (or sales).
- **Job destruction:** The destruction of jobs (disestablishing jobs) as businesses downsize or fail. It provides a measure of stability in job security for workers in the industry.
- **Labour units:** The number of hours worked in generating the GDP produced in an industry or economy.
- **MFP (multi-factor or total productivity):** Total production (GDP) divided by capital units and labour units.
- **Net profit:** A measure of the profitability of a venture after accounting for all costs including cost of sales and direct costs, taxes, interest, overheads and one-off costs.
- **Net profit margin:** Expressed in percentage terms, this measures profits after tax, overheads, payroll and interest payments, divided by turnover.
- **Performance:** The effectiveness of a firm or industry in achieving its primary objectives.
- **Productivity:** The ratio of outputs (usually GDP in technical estimates) divided by inputs (usually capital and labour).
- **Taxable profit:** Turnover less cost of sales, overheads and payroll
- **Taxable profit margin:** Expressed in percentage terms, this measures profits after overheads and payroll, but before tax and interest, divided by turnover.
- **Worker turnover:** The number of workers joining or leaving jobs within the industry. This indicates the ability of an industry to retain workers rather than having them leave the industry for another industry or to stop working altogether.