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Adopting new ways in the building and construction industry

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Preface

This report explores human factors and structural systems around adopting new ways of doing things in the building and construction industry. The aim is to identify the barriers and enablers of change. The research purpose is to both identify and prioritise action to improve adoption of new ways in the industry by engaging with industry practitioners to elicit their views and ideas.

A series of evidence-based recommendations provides guidance for the next steps in moving towards greater adoption of new ways of doing things in the industry. The aim is to improve quality and productivity in the sector.

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Abstract

This project explores the human factors behind the industry's willingness or otherwise to adopt new practices, even when there is clear evidence of potential advantages to them in doing so. It is a study of behaviour, attitudes and beliefs, as well as a study of systems that prevent or enable change.

The research is based on an understanding that there are improved ways of doing things available to the building and construction sector in New Zealand. The question explored is why some of these new ways are either not being adopted or only on a small scale, when large-scale adoption would make a difference to productivity and quality.

This is important research, as identification of new practices and solutions to improve productivity and eliminate quality issues will have no impact if those solutions are not adopted by industry.

Keywords

Change, barriers to change, change resistance.

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Executive summary

This research explores the New Zealand building and construction industry's perceptions regarding uptake of new ways of doing things. The focus of this research has been on vertical construction, specifically residential housing, and we have engaged with people who work in this sector. Civil and other construction is excluded.

By 'new ways of doing things', this research includes a range of processes, practices, technology, systems and skills. They are referred to as new because they differ from the more traditional methods of construction utilised in the building process.

For the purposes of this research, new ways of doing things means those things that have the potential for improving how construction takes place and how the industry overall operates. By improvements, this research means being able to build better, faster, cheaper, more able to meet needs or more efficiently.

This work has been undertaken so we can explore three things with industry:

- Are there ways of doing things that are available and that would improve the construction process?
- If those new ways of doing things are available, have they been adopted by industry with positive effect?
- If they haven't – and this is the crux of this exploration – why not?

It is timely to ask these questions. There is significant pressure on industry to improve both productivity and overall scale of output, particularly in relation to the number of residential new builds required to meet need. The research focuses on uptake of new technologies in an area where there is significant potential for innovation to have impact in terms of what we do, how we do it and what it costs. It seems counter-intuitive to consider solutions that have benefits that are not being widely adopted. This research explores whether that is the case, and if it is, why? What is stopping the update of potentially better ways of doing things?

This research has confirmed with our research participants that there are new ways of doing things that are available to industry. These include technological solutions such as BIM as well as process solutions such as group tendering. We have also confirmed with our research participants that solutions that could potentially improve what industry does and how it does it are not always taken up across industry. Where there is uptake, it may only be by some players in some areas or uptake is sporadic. We have engaged with industry to find out why this is the case.

The overall findings of our research are that there are four main barriers to the uptake of new ways of doing things:

- **Cost:** Change often involves investment of time and money. This can be a deterrent to making that change. In the New Zealand building and construction sector, there is often pressure on both time and money due to the competitive nature of the industry. Where contracts may be won or lost on the basis of cost and time, the climate is not supportive of investing time and money into new ways of doing things.
- **Education and skill levels:** In order to adopt new ways of doing things, participants in the sector need to both understand the change and have the skills to adopt it. If these skills are not present, new ways will not be adopted. There is

some evidence that the skills that enable uptake of new ways of doing things, particularly in relation to information technology (IT) solutions, are not present in the current workforce.

- **Regulation:** The regulatory environment in a risk-averse industry disinclines adoption of new ways of doing things. In the New Zealand context, there is high aversion to risk that is historical. This is not a climate in which any player in the sector wishes to expose themselves to potential risk by using or adopting untried, untested or unfamiliar ways of doing things.
- **Social inertia:** It is in our nature as people and societies to resist change. This may be the case even when that change is advantageous. This resistance to change is clearly evident when looking into why new ways of doing things are not taken up in the building and construction industry in New Zealand.

As well as identifying barriers to uptake, this research has identified ways that change can be supported and enabled. The biggest area identified in this research where change can make a significant difference is related to regulatory settings. Easing regulatory processes – and reducing the time taken with these processes – was identified as being the single most important change that could enable greater adoption of new ways in the sector. Examples are a more fully electronic system, management of alternative designs and ability to respond quickly to changes in the sector. Any change in this area was seen as having the most impact in enabling more flexibility and responsiveness to new ways of doing things. In such an environment, industry players would be more likely to try new things. This would make a difference.

The second most important enabler of change is related to the cost of innovation. If new ways of doing things are to be adopted, the cost to the sector must be minimised. Few people are willing, at this time, to invest time and money into new ways of doing things where the impacts are not proven to their satisfaction. A new way of doing something has to be a value proposition if it is to appeal.

Additional investment in education and upskilling of the current workforce as well as attracting more of the right skills to the sector are also seen as having a potentially significant impact.

The matter of human nature is a harder one to change. Many in the sector simply do not see benefit in adopting new ways, particularly when they feel that the old tried and true ways of working have served them well. Changing this type of attitude might be possible through a more tangible demonstration of the advantages to be gained by adopting new ways. An innovation park or other such example may be an effective approach to changing this attitude. The best way to encourage others to adopt new ways is to show that doing it this way is advantageous to them, costs little and delivers clear benefits.

Overall, in principle, the industry is open to change. While 40% of respondents in our survey indicated that their attitude to change is to want to get involved, only 5% reported actively disliking change. This sends a clear message that new ways of doing things will be adopted if the barriers to doing so are removed or decreased.

The building and construction industry in New Zealand knows it needs to change and it can improve. It is looking for leadership and intelligent change management to enable this to happen. According to the participants in this research, industry is not unwilling to change but is currently unable to do so. This can and needs to be remedied.

What is also clear from this research is that those who are in a position to influence either barriers to or enablers of adopting new ways can do so – with significant impact. One of the clearest calls from participants throughout this research was for leadership in this space.

This research is preliminary and explorative in nature. It presents a large number of themes from a wide spectrum of viewpoints. It covers technology, people, practices and processes. Ideally, it would be beneficial to comment on these themes in detail. However, due to the nature and timeframe of the work undertaken, they are presented as a whole. There is a need for more work in this area, for more focus and for clarification. These are the recommended next steps.

1. Description of the research

1.1 Research aims

The research addresses five key questions:

- Do we need to change?
- What change is needed so the sector can adopt new ways of doing things?
- What are the barriers to change?
- What are the enablers of change?
- What are the priority areas for change?

1.2 Methodology

We asked building and construction industry players to provide us with their views on what needs to change in the New Zealand industry. We invited respondents to discuss what they thought was not working well in the industry, and this has been captured in this analysis.

Participants identified that there were new ways of doing things, mostly technological in nature, that would make a difference if they became part of how industry works. This includes solutions such as BIM. However, participants were clear that these solutions were not taken up by all or, in some cases, by many at all and therefore did not have the impact that potentially was on offer.

When asked why new ways of doing things are not always taken up by industry, even when they may improve how industry operates and performs, respondents provided us with a set of barriers to uptake, which are discussed fully later in this report.

The research was undertaken using a mixed-methods approach that included a large survey and a small number of workshops.

Literature review

This considered research, media and policy documents on the adoption of change. It included both New Zealand and international literature. Literature relating to the building and construction industry was prioritised. This work formed the context for our analysis of research participant input.

Online survey

An online survey offered to industry stakeholders provided us with views on the research questions from the perspective of individuals, organisations, sectors and the industry as a whole. The survey was conducted using SurveyMonkey software. It was disseminated through BRANZ social media (Twitter and LinkedIn), supporting newsletters and direct email channels.

The survey was analysed and the main themes identified. These themes were then tested with participants in the workshops.

The text of the survey can be found in full in Appendix A.

Workshops

Eight workshops were held across New Zealand in Auckland (2), Palmerston North, Wellington (2), Nelson, Christchurch and Queenstown. These delved deeper into some of the findings from the online survey.

1.3 Ethics

This research has ethical approval from BRANZ's external human ethics advisor, in accordance with BRANZ's human ethics policy.

1.4 Disclaimer

This research presents the views of our research participants.

We have analysed the information they provided and present it in this report. All opinions presented in this report are the opinions of the research participants.

2. Context

This research needs to be considered in the context of a general understanding of change and an understanding of the building and construction industry both generally and in New Zealand specifically.

This chapter provides that context.

2.1 How do we respond to change?

Juma (2016) argues that resistance to new ways of doing things is part of being human. Lewin (1947) suggested that "social systems, like biological systems, have a tendency to maintain the status quo by resisting change". Juma describes this as the "tension between the need for innovation and the pressure to maintain continuity, social order, and stability". What Keen (1981) has called "social inertia" is one of the subjects addressed in this study.

We as a society often fear technology, with Juma arguing that "advances in technology signal both hope and fear" (Juma, 2016). Bhattacherjee and Hikmet (2007) hypothesised that IT is often perceived as a threat and as something that disrupts the users' normal patterns of work. They state that:

> ... the introduction of a new system often engenders significant changes in users' existing work processes. If such change is of sufficiently high magnitude, given natural human proclivity to oppose change, many users will resist the technology.

They refer to user resistance to new technology as "an inalienable part of the users' psyche" in what they call the "IT resistance phenomena".

Why does this matter? Technological innovation offers potential for improved productivity and improved quality. There is nothing new about this concept. Stewart (1957) points out that "the handloom weavers of early nineteenth century Britain did their best to resist the introduction of power looms".

Bhattacherjee and Hikmet's 2007 study in the context of healthcare providers focused specifically on why seemingly useful technologies are sometimes resisted by potential adopters. They concluded that "resistance to change is caused by perceived threats on

the part of targeted users … [and that] this threat was physicians' fear of loss of control over their work".

This is particularly important when considered in the context of the building and construction sector – an area acknowledged as one where there is room for substantial improvement.

2.2 The New Zealand context: a low-productivity sector

The construction industry globally is not highly productive. While this industry is one of the largest in the world economy, its productivity has grown an average of only 1% per year over the last 20 years. In comparison, the manufacturing industry has increased productivity by 3.6% per year during the same time period (Barbosa et al., 2017).

Currently, the New Zealand building and construction industry needs to significantly increase its productivity to meet the expected demand for residential and non-residential construction. Innovation in the industry is the key to increasing productivity. Change within the industry is required so innovation can deliver on demand. Without the change that enables innovative new practices and methods, the industry risks losing the opportunity to capitalise on this demand (PwC, 2016).

Barbosa et al. (2017) identify 10 root causes of this low-level of productivity in the global construction industry as:

- increasing project and site complexities
- extensive regulation, land fragmentation and the cyclical nature of public investment
- informality and potential for corruption distort the market
- construction is opaque and highly fragmented
- contractual structures and incentives are misaligned
- bespoke or suboptimal owner requirements
- design processes and investment are inadequate
- poor project management and execution basics
- insufficiently skilled labour at frontline and supervisory levels
- industry underinvests in digitisation, innovation and capital.

The Ministry of Business, Innovation, and Employment (MBIE) Productivity Partnership identified possible root causes for low productivity in the New Zealand-specific context. Some of the reasons include:

- large variations in productivity within the construction industry between the construction services/heavy/civil sectors and the residential/non-residential sectors
- competition and market conduct particularly at a regional level
- large differences in practice between businesses of different sizes
- construction sector workers typically earn higher wages than workers in other sectors with similar skills, which may be a barrier to acquiring skills that could enhance productivity
- resistance to using new technology.

2.3 Current literature on what needs to change

The need for change in the New Zealand construction industry has been well documented in a variety of reports, notably Ministry of Business, Innovation, and

Employment (2016) and Barbosa et al. (2017). With an impetus to increase productivity to meet future demand for construction, these reports recommend improvements in specific areas of practice across the industry value chain. These are summarised in Table 1.

Table 1. Summary of literature on what needs to change in the building and construction industry in New Zealand.

Source	Area for change
Barbosa et al., 2017	• Regulation. • Collaboration and contracting. • Design and engineering. • Procurement and supply-side management. • On-site execution. • Technology. • Capability building.
MBIE Productivity Partnership (2016) (industry)	Residential construction: • Moving to design and build in parallel. • Improving project management such as better scheduling of resources on site. • Moving to an online consenting process. • Adopting technical solutions to reduce weather delays. • Increase use of standardisation, while still meeting clients' desire for individual design. • Recognising that productivity drivers are different for large, group home builders and small individual firms so solutions differ for each. Commercial construction: • Educating clients for more informed decisions at a project's early planning stages, based on whole-of-life value rather than lowest, upfront cost. • Increasing focus on non-technical skills such as communication, project planning and a positive project culture. • Identifying and actively managing potential risks. • Actively managing supply chain and procurement strategy. • Using smart technology, such as three-dimensional modelling, and ensuring different technology platforms are compatible. • Learning from other projects.
MBIE Productivity Partnership (2016) (systems mapping)	• Improving workforce literacy and numeracy, management capability and planning for building activity. • Increasing client education. • Considering life cycle impacts and refurbishment intervals. • Exploring alternative financial products and liability, i.e. accepting responsibility for work done. • Increasing use of standardisation, digital modelling tools, modularisation and buffers, i.e. providing some slack in project timeframes to allow for complexities. • Introducing quality management systems. • Increasing the focus on health and safety, building consent authority validation and maintenance. • Improving indoor environmental quality, information accessibility and operational adaptability.

	No single action will increase productivity in the built environment. The way forward is a package of interventions. The top three areas where productivity can be improved in house construction are: • early project stages including scoping, design and site selection • consenting and tendering processes • project planning and project management, particularly who is on site when. Client knowledge and behaviour also have a significant impact on productivity. It is recommended that the following four areas are targeted for productivity improvements in the small builder/new housing market: • Client education – improving client knowledge and understanding of the design and building process could reduce the time taken to finalise the design stage from 25 weeks to 10 weeks. • Consenting and tendering processes – standardising contracts, improving technology use and having an effective online consenting process could save up to 20 working days. • Project planning and project management – products tailored specifically for the residential building market could reduce construction time from 15 to 9 weeks. • Technical solutions to reduce weather delays – cost-effective and practical technical solutions for small builders in the residential market will result in considerable time savings. The following areas provide significant opportunities to increase productivity: • Prefabrication to reduce skilled labour requirements/total labour input. • House size reduction – both overall footprint and room size. • Design that incorporates common infrastructure elements in multiple houses – terraced, semi-detached, multi-storey. • Deskilling of the construction process. • Active management of logistics to reduce transportation costs.

A recent review of building quality issues in New Zealand (Gordon & Curtis, 2017) identified four core underlying aspects relating to industry performance and its effect on building quality as:

- smaller firms' inability to implement changes
- perception of the industry being an undesirable career pathway – compounded by existing capability
- competition encouraged over cooperation
- fragmentation of industry structure.

They also identified things that affect quality and suggested priority areas for change as being:

- the regulatory environment
- the construction workforce
- building materials

- the construction process
- knowledge and information.

2.4 Why should the industry adopt new ways?

In the New Zealand context, housing demand is not being met. Where there is pressure to build more, better, faster, the question of adopting new technologies in the industry – or not – is particularly important.

New technologies have the ability to enable a better response to current and future demand. Such technologies include:

- building information modelling (BIM)
- skills badging
- employing more women in the industry
- increasing medium-density housing builds
- builders' apps (phones and iPads/tablets)
- green building standards
- use of cross-laminated timber (CLT)
- prefabrication and modularisation
- group tendering
- construction waste minimisation.

We have identified a need to support industry to adopt new solutions and change practices for the better. Simply, there are solutions and technologies out there that could be applied. So why aren't they?

This research has gathered the views of those in the industry about why adoption of new ways is not occurring at the scale it potentially might.

3. Literature review on adopting new ways

This literature review seeks to understand and explain what has been written about the nature of change and the opportunities and challenges associated with adopting new ways. It considers research and policy documents regarding the adoption of change, focusing on the building and construction industry, including both New Zealand and international literature.

The literature has been examined with regard to three themes:

- Societal responses to adopting new ways.
- Adopting new ways in the global building and construction industry
- Adopting new ways in the New Zealand building and construction industry.

In order to build a general understanding of the drivers, barriers and enablers of change, this literature examination begins by looking at society as a whole. It then explores how adopting new ways has manifested in the global building and construction industry before considering the opportunities and constraints for adopting new ways in the New Zealand industry.

The final section summarises the findings of this literature review against each of the five research aims of this study report. Noting how these findings diverge or converge with those from the online survey and workshops will provide a full picture of how best to promote the adoption of new ways in a New Zealand context.

3.1 Societal responses to adopting new ways

As noted previously, resistance to new ways of doing things is part of being human (Juma, 2016) and is a characteristic that has been extensively researched. We draw on this body of research to provide a general understanding of societal responses to adopting new ways. It also provides a means of framing later discussion on the nature of change in both the global and New Zealand building and construction industries.

First, however, it is useful to define the term ‘change’. The Oxford Dictionary defines change as an act or process through which something becomes different. In relation to organisations, Bouckenooghe (2010) describes change as the gap that exists between the current situation and where one should be (the desired situation). This is useful in thinking about the temporal aspects of change – for example, that change is an ongoing process, not a single event (Hall & Hord, 2014). These definitions should be kept in mind when considering the following subsections.

3.1.1 Openness to change

Change, particularly in relation to the introduction of new technologies, is a stressful process for any society (Haymes, 2008). Although resistance is probably the best-known attitude towards change (Bouckenooghe, 2010; Dent & Goldberg, 1999), the literature also explores openness to change as a positive way of encouraging the adoption of new ways. Miller, Johnson and Grau (2009) describe openness to change as comprising two parts. First, it is a willingness to support change, and second, positivity about the potential consequences of change, such as feeling that the change will be beneficial in some way.

Framing change in a positive manner – viewing change as a means of seizing opportunities for improvement or motivating people to perform at a higher level –

provides a pathway to readiness for change. A more negative frame is to see change as a way of overcoming problems or weaknesses (Bouckenooghe, 2010). This attitudinal framing will be important when later considering barriers and enablers to change.

Goh, Cousins and Elliot (2006) similarly identify that readiness for change is created through a culture of openness and flexibility, which influences how much people are adaptable and open to new ideas. Having a positive view about the need for change and the belief that change has positive implications is therefore a powerful enabler to encourage the adoption of new ways.

Interestingly, although resistance is viewed as the tendency to avoid making changes, the literature indicates that resistance is not all bad. Rather, resistance can also lead to positive outcomes as it is a process that fosters organisational learning (Bouckenooghe, 2010). Also, resistance is often not directed at the change itself but at the way the change is introduced, leading to a loss of control (Stewart, 1957). Such factors can be overcome to harness the opportunities presented by resistance to change, reframing them in a positive manner to encourage the adoption of new ways and improve organisational performance.

3.1.2 Scale of change

Change can be big or small (Damanpour & Wischnevsky, 2006) and either radical or incremental in nature. D'Ortenzio (2012 defines radical change as being large-scale, organisation-wide transformation initiatives that can be rapid and wholesale, while incremental change is small-scale, localised and usually specific to addressing a particular problem.

The scale of change is important as it will impact how people react and how the change should be managed. Changes that are incremental in nature typically require less change management, as people are not moving far from the status quo. Radical change, however, requires more change management as the future state is largely unknown and the status quo is left further behind (Creasey, 2017).

Notwithstanding, even radical or large-scale change can usually only happen in steps (Lawson & Price, 2003). As Haymes (2008) notes, incremental change is the best we can hope for in many cases. Breaking large-scale change down into incremental steps may therefore help overcome barriers to adopting new ways.

3.1.3 The role of innovation

The practice and acceptance of innovation is intertwined with change and the adoption of new ways. Gambatese and Hallowell (2011a) define innovation as positive change that results from the implementation of new ideas. Without innovation, there would be little motivation to change and few new ways to adopt.

Alsher (2017) cautions, however, that innovation in and of itself can be complex. It usually involves large-scale and highly complex organisational change, with multiple interdependencies. Even so, there is a natural imperative to innovate and adapt, given that organisations cannot avoid changing if they are to survive (D'Ortenzio, 2012).

Although writing in the mid-20th century, Stewart (1957) highlights that innovation is typically high in expanding industries where change breeds change. This is as relevant in today's era of rapid technological advancement as it was in Stewart's time. It indicates that momentum, or sustained innovation, is required to successfully

encourage industries or organisations to adopt new ways. Such momentum may be a key enabler to adopting new ways in the building and construction industry.

With this in mind, the following section summarises relevant literature on the adoption of new ways in the global building and construction industry.

3.2 Adopting new ways in the global building and construction industry

This section provides a starting point from which a comparison with the New Zealand context can be made.

3.2.1 Nature of the building and construction industry

Much has been written about the unique nature of the building and construction industry, particularly when compared to other basic industries such as manufacturing and mining. Building and construction is viewed by some as not a single industry, but rather a conglomerate of industries, or a meta-industry involving multiple participants. It also differs from other industries in that building and construction projects are largely one of a kind, in different locations, and likely to use different teams per project (Fernández-Solís, 2008).

These characteristics have contributed to the traditionally low productivity of the building and construction industry globally and in New Zealand, as outlined previously. Low productivity may be exacerbated by the slow evolution of the industry. Barbosa et al. (2017) note that it is beset with misaligned incentives among owners and contractors and with market failures such as fragmentation and opacity.

Such conditions indicate that change in the building and construction industry is required to offset this slow state of evolution. Indeed, change is not a new phenomenon for industry participants. As Erdogan et al. (2005) note, construction companies are used to dealing with change at the project level (such as design changes) but not necessarily at the organisation level (for example, adopting new ways of doing things). Such organisation-level change may be difficult for construction companies due to geography, organisational structure, size and the multi-disciplinary and bespoke nature of projects.

Notwithstanding these challenges, the Barbosa et al. (2017) note that change may not be a distant prospect, given that there are currently signs of potential disruption in parts of the global construction industry.

3.2.2 Barriers to change in the global building and construction industry

If Barbosa et al. (2017) are correct in noting that change in the global construction industry is not a distant prospect, it is timely to examine the possible barriers to the uptake of such change. This will prepare the industry to overcome identified barriers and challenge the perceived cultural resistance to change that is pervasive across the industry and clients (Farmer, 2016).

Farmer (2016) identifies 10 symptoms of failure and poor performance in the UK construction industry. Two of these are relevant to adopting new ways, including a lack of research and development and investment in innovation and a lack of collaboration

and improvement culture. These barriers to change are examined in further detail below.

Gambatese and Hallowell (2011b) consider that innovation in the construction industry requires three components: idea generation, opportunity and diffusion. It follows that, if time and financial investment are not made at the idea-generation stage, then opportunity is not provided and the diffusion of innovation will not occur.

Farmer (2016) further identifies a 'chicken and egg' impasse within the industry, whereby innovation tends to require proof of concept before it is widely adopted. However, technically and commercially proving a concept cannot occur until it is adopted or deployed at scale. This is also noted by Gambatese and Hallowell (2011a) who believe there is a greater level of diffusion of innovative products as the perceived risk of failure decreases.

Risk is a recurrent barrier to change in the literature reviewed. Difficulties are identified in getting new products and propositions to market at any scale, due to a deep-seated perception of risk within the wider supply chain. The barrier is the desire for a robust, if not guaranteed, benefits case before a new product or proposition is adopted (Farmer, 2016).

A lack of collaboration is also seen as a barrier to adopting new ways in the global building and construction industry. Farmer (2016) identified a collaboration problem as being the root cause of the UK construction industry's change inertia. A lack of collaboration is seen to prevent the industry scaling up, sharing risk more appropriately and, potentially, from adopting new ways.

Another aspect disincentivising collaboration is seen to be a fundamental unwillingness to divulge competitive advantage or intellectual property (Farmer, 2016). Commercial sensitivity is therefore a major barrier to overcome in implementing change as it relates to adopting new ways that may give some industry participants a competitive advantage over others.

3.2.3 Enablers of change in the global building and construction industry

As well as identifying barriers to the building and construction industry adopting new ways, the literature reviewed also reinforces that various enablers of change exist. These enablers take various forms and are discussed in turn below.

Gambatese and Hallowell (2011a) note that effective upper management is a significant enabler of change within the building and construction industry. Taking collective responsibility for change and improvement can provide consistency of vision and motivation to change, while avoiding barriers such as fragmented leadership and decision making (Farmer, 2016).

In addition, change can be led not only by industry practitioners but also by clients. Farmer (2016) notes that the building and construction industry will not change unless there is client demand. Similarly, Blayse and Manley (2004) identify clients and manufacturing firms as key industry participants in terms of driving innovation. This suggests that raising client awareness of the existence and benefits of alternative building technologies and processes may provide a valuable enabler to the industry adopting new ways.

Another significant enabler of effecting change in the building and construction industry is harnessing youth. As noted by Heintz and Wamelink (2015), the ignorance of youth can be a powerful force in the adoption and diffusion of innovations. Despite its somewhat patronising tone, this suggests that youth in the industry have an open mind and may not have preconceived ideas limiting their willingness to adopt new ways. Encouraging a new generation of workers who have grown up in a digital world may therefore provide a powerful catalyst for the industry to adopt new ways and improve productivity (Farmer, 2016).

Training was cited as another key enabler of change in the building and construction industry. Barbosa et al. (2017) noted that construction firms and workers need to continuously reskill and train to use the latest equipment and digital tools. This is particularly applicable given the fast pace of technological innovation experienced both within and outside the building and construction industry.

It is useful to keep these findings in mind as we turn our attention from the global building and construction industry to that in New Zealand..

3.3 Adopting new ways in the New Zealand building and construction industry

This section summarises literature regarding the adoption of new ways in the New Zealand building and construction industry. To assist comparison, it follows the same themes identified for the global building and construction industry in the preceding section.

3.3.1 Nature of the New Zealand building and construction industry

The construction sector plays a key role in the New Zealand economy. It accounted for 10% of total employment and contributed 8% of New Zealand's total GDP in 2015 (PwC, 2016). It is also a growing sector. Stats NZ (2018) notes in its business operations survey 2017 that investment in expansion was reported in close to half (43%) of construction businesses.

The New Zealand building and construction industry is, however, characterised by a variety of factors that may inhibit its ability to innovate and adopt new ways. One of these is the boom and bust nature of the industry. PwC (2016) notes that the construction industry continues to struggle with the cyclical nature of work. Westpac (2017) further identifies that this boom and bust nature encourages a short-term focus on operational issues, leaving less time available for innovation or adopting new approaches.

In addition, the New Zealand building and construction industry is characterised by small firms. Westpac (2017) highlights that about 86% of firms in the residential building industry have five or fewer employees. These small firms may be less likely to innovate, given the comparatively fewer resources available to do so.

The skill level of workers within the New Zealand building and construction industry may also influence its ability to adopt new ways. Westpac (2017) notes that the New Zealand residential building industry employs a large number of relatively unskilled or semi-skilled people – 20% with no qualifications and 30% with school qualifications only. It will be interesting to establish whether there is a correlation between skill level

and the uptake of innovation within the industry via the online survey and workshops undertaken as part of this study.

Setting aside these characteristics of the New Zealand building and construction industry, it is evident that, without change, the sector will struggle to meet demand. PwC (2016) suggests that there is a significant task ahead to accommodate new private sector and government demand, particularly in the residential sector. This is compounded by a housing shortage in Auckland and the government's ambitious KiwiBuild scheme.

3.3.2 Barriers to change in the New Zealand building and construction industry

In order to meet this demand in the New Zealand building and construction market, it is timely to identify barriers to change so that they can be understood and overcome.

As with the global building and construction industry, Westpac (2017) suggests that a reluctance to invest in people, processes, new technologies and products has contributed to relatively low rates of innovation in the industry. The risk-averse nature of the global industry is also mirrored locally, resulting in a focus on operational issues and making it difficult for firms to invest time and money developing, learning and adopting new approaches. As a result, new products are slow to be introduced to market, and due to a perceived level of risk, diffusion can be sluggish.

In contrast to the global building and construction industry, however, are barriers unique to the New Zealand context, including scale. The typically small size of developments in New Zealand reduces the benefits of standardisation and other innovative approaches. The regulatory environment provides another barrier, particularly compliance with the Building Code and Resource Management Act (Westpac, 2017). These perceived local barriers are explored further in this report through the findings from the online survey and workshops undertaken as part of this research.

3.3.3 Enablers of change in the New Zealand building and construction industry

The literature reviewed indicates that the New Zealand building and construction industry is in a good position to adopt new ways. It is able to react relatively quickly to cyclical and disruptive factors (Westpac, 2017). This is particularly the case if a range of enabling factors are in place to motivate, influence or incentivise the adoption of new ways.

One such enabling factor, also identified in the global building and construction industry, is the impact of customers (or clients) in driving demand to adopt innovative products and processes. In the New Zealand context, this means moving away from client-requested bespoke design solutions to explore the benefits of standardisation and mass-customisation (PwC, 2016).

Training is another enabler identified in both the global and New Zealand building and construction industries. PwC (2016) identifies that there will be an increased need for highly skilled workers in New Zealand if the sector moves towards more innovative approaches to construction. Similarly, training can also be provided to raise awareness of the cost benefits of adopting new ways. For example, Westpac (2017) notes that

cost minimisation can be a significant driver for large firms to adopt new ways (such as off-site prefabrication) and remain competitive in a rapidly evolving market.

Another enabler or intervention identified by PwC (2016) is the potential for government to smooth volatility in the construction cycle by planning its investment programmes to support the industry in a downturn. There is the potential to avoid such downturns if government sector demand can counteract falling private sector demand at times of market volatility.

These enablers, if harnessed, represent an opportunity for the New Zealand building and construction industry to adopt new ways, increase traditionally low industry productivity and meet demand to provide quality build solutions for New Zealanders.

3.4 Summary

Overall, the literature reviewed can be summarised in relation to the stated research aims as follows.

3.4.1 Do we need to change?

The literature clearly indicates the need for change in the New Zealand building and construction industry. It needs to adopt new ways and improve productivity, particularly in the residential sector, to meet current and upcoming demand for housing. PwC (2016) succinctly notes that the opportunity for the New Zealand construction sector is significant but that the sector will not be able to meet the challenge without change.

3.4.2 What change is needed so the sector can adopt new ways of doing things?

In general terms, the literature identifies innovation and perceived risk as the main changes required so that the sector can adopt new ways of doing things. As noted by Westpac (2017), low rates of innovation lead to low industry productivity. Greater investment in innovation is therefore needed, alongside a focus on diffusing innovation in a way that minimises perceived levels of risk (Westpac, 2017; Farmer, 2016).

3.4.3 What are the barriers to change?

The barriers to the building and construction industry adopting new ways are numerous, including the:

- perceived risk
- lack of collaboration among industry participants driven by commercial sensitivity and competitive advantage (Farmer, 2016)
- boom and bust nature of the industry, which results in a short-term focus on operational issues (Westpac, 2017)
- typically small size of construction firms in New Zealand, which have limited resources for innovation (Westpac, 2017)
- potentially low skill levels of workers, which may impede the adoption of new ways
- regulatory environment, particularly the processes for demonstrating that new products are compliant with the Building Code (Westpac, 2017).

3.4.4 What are the enablers to change?

Fortunately, the literature reviewed also indicates there are a variety of enablers to change in the New Zealand building and construction industry, including:

- framing change in a positive manner to create a pathway to readiness for change (Bouchenooghe, 2010)
- having effective upper management within building firms to lead the adoption of new ways (Gambatese & Hallowell, 2011a)
- raising client awareness of the benefits of adopting new ways, given that the industry is unlikely to change without client demand (Farmer, 2016)
- harnessing youth to effect change and utilise and diffuse new technologies (Heintz & Wamelink, 2015)
- training to continuously upskill firms and workers to use the latest equipment and digital tools (Barbosa et al., 2017).

3.4.5 What are the priority areas for change?

The literature reviewed did not specifically indicate priority areas for change in the New Zealand building and construction industry. It follows, however, that the priority areas should be those identified as needing to change so that the sector can adopt new ways.

In this case, the priority areas for change include investing in innovation and overcoming risk aversion to new products and processes. If these two areas can be addressed alongside the barriers to and enablers of change identified above, the New Zealand building and construction industry should be in a solid position to adopt new ways and increase productivity.

4. Online survey

4.1 Survey methodology

The survey first asked the respondent to identify themselves according to the following criteria:

Where are you primarily located?

Within which sector do you work?

What size is the organisation you work for?

What is your position?

What is the organisation's total annual income?

Describe your organisation.

The next set of questions aimed to understand how participants thought about change on the individual, organisational, sector and industry levels:

What statement do you relate to the most, in terms of process and/or technological change?

- Dislike change
- Only change when there is no other option
- Wait and see what happens before I decide to change
- Get involved in change at the first opportunity
- Lead change

What sector do you see the greatest reactions to process and/or technological change?

- Architecture, Design, Urban Design & Planning
- Building Officials & Building Surveying
- Building & Construction Trades
- Business Consultancy
- Central Government
- Civil Infrastructure Trades
- Electricity Supply Infrastructure
- Education
- Professional Engineering
- Property & Facilities Management
- Quantity Surveying & Project Management
- Science & Research
- Water & Wastewater Trades
- Other (please specify)
- Not stated.

Thinking of recent developments in the sectors above, what were/are the drivers and barriers for process and/or technological changes? (Open-ended response)

What is your most recent experience of process and/or technological changes in the sector you named above? (please describe what it was, how you and others reacted, was it voluntary or mandatory, other) (Open-ended response)

Who/what influences positive process and/or technological change outcomes? (please explain) (Open-ended response)

What makes you resist process and/or technological change? (please explain) (Open-ended response)

Where are the biggest changes needed? (please explain) (Open-ended response)

Finally, respondents were invited to add any additional comments about any matter of relevance to the survey.

See Appendix B for an analysis of survey findings.

4.2 Who responded?

The researchers sent a survey to 16,790 people on the BRANZ database. Of these, 1069 bounced due to incorrect (probably out of date) email addresses. A total of 9,338 opened the email inviting them to participate, and 4,986 opened the survey.

A total of 751 responded by completing all or part of the survey.

Demographically, the survey participants were concentrated in the urban centres of Auckland (30%), Wellington (17%) and Christchurch (16%).

Architecture, design, urban design and planning (31%) and building and construction trades (34%) were most often represented occupational categories.

Most participants (35%) worked at firms that employed between one and five people. However, 19% worked in firms with over 100 people.

Most participants worked at either senior (41%) or executive (21%) level in their company. Sole traders comprised 19% of respondents.

Most participants (71%) did not report the annual income for their company. For the 219 that did, company annual income was reported by 29% as between $100,000 and $1 million, with 18% reporting less than $100,000. One respondent reported zero income.

Of the 145 who answered the question regarding the type of organisation they worked for, 73% worked in private incorporated firms/limited liability companies. A further 15% reported being from non-governmental organisations.

4.3 Summary of survey findings

Each respondent was asked to provide their views on their attitudes towards change. Overall, the survey found that attitudes towards change were reasonably positive, with most respondents reporting their perspectives as being in the ‘wait and see’ or ‘get involved’ space.

When identifying barriers to change, the most consistently mentioned as being the most important were:

- regulation
- cost
- lack of guidance
- poor attitudes.

Attitudes to change were reported as varying significantly when occupational class was considered. There was one sector that was perceived as being less open to change than others, i.e. disliked change or only changed when there was no option. This was central government, with 33% of respondents rating it as negative towards change. The sectors perceived as being most positive about change were science and research, and business consultancy.

Perceived barriers to change were identified by 398 respondents. For 35% of those respondents, the biggest perceived barrier to change is red tape (regulation, bureaucracy, compliance). For a further 18%, cost is the biggest barrier.

The single most important perceived enabler of change identified by the 165 respondents who answered this question is pricing, low cost and/or profitability (38%). The second most commonly identified enabler of change (21%) is related to new products (better or cheaper).

Influences for change were identified by 194 respondents. Respondents perceived there is potential for the most benefit to be realised from change in BCA/legislative and BCA area (26% of respondents).

Respondents were asked to identify areas of the sector where change is most accepted. The 413 respondents who answered this question identified architecture as being the area where there is most acceptance of change (29%), followed by science and research (21%). The question regarding resistance to change was answered by 423 respondents, with building officials (25%) and building trades (24%) being seen as the areas where this is most common.

Reasons for resistance to change were identified by 278 respondents. The most commonly stated reason (17%) is cost of change without any clear benefits seen for the investment.

A total of 288 respondents identified areas where they think the biggest change is needed. For 38% of those respondents, the priority area for change is in the regulatory system. This relates to either central government (MBIE) or BCAs. A further 15% identified upskilling as the priority area, including more education and better access to information.

4.4 Attitudes to change

Respondents were asked to share their attitudes towards change when coming from different perspectives. These were as an individual, as a company (the company they worked for), as part of their sector (builder, BCA and so on) and as part of the building and construction industry as a whole. Our analysis summarises how participants feel about change – whether they like it, dislike it, embrace it or resist it.

Overall, 421 respondents answered this question. Most respondents expressed a positive attitude towards change, with 40% indicating they get involved in change at the earliest opportunity and 23% indicating they want to lead change. A total of 28%

indicated they prefer to wait and see before they decide, 5% stated they only change when there is no option and a final 5% indicated they dislike change.

Figure 1. Respondents' attitude to change.

This represents a relatively positive response by most of the participants who answered this question.

When analysing these attitudes by sector/industry, wastewater, science and research, electricity supply and education are the sectors seen as most likely to be positive about change (Figure 2). Those seen as most likely to be negative about change are in the central government, quantity surveying and project management sectors.

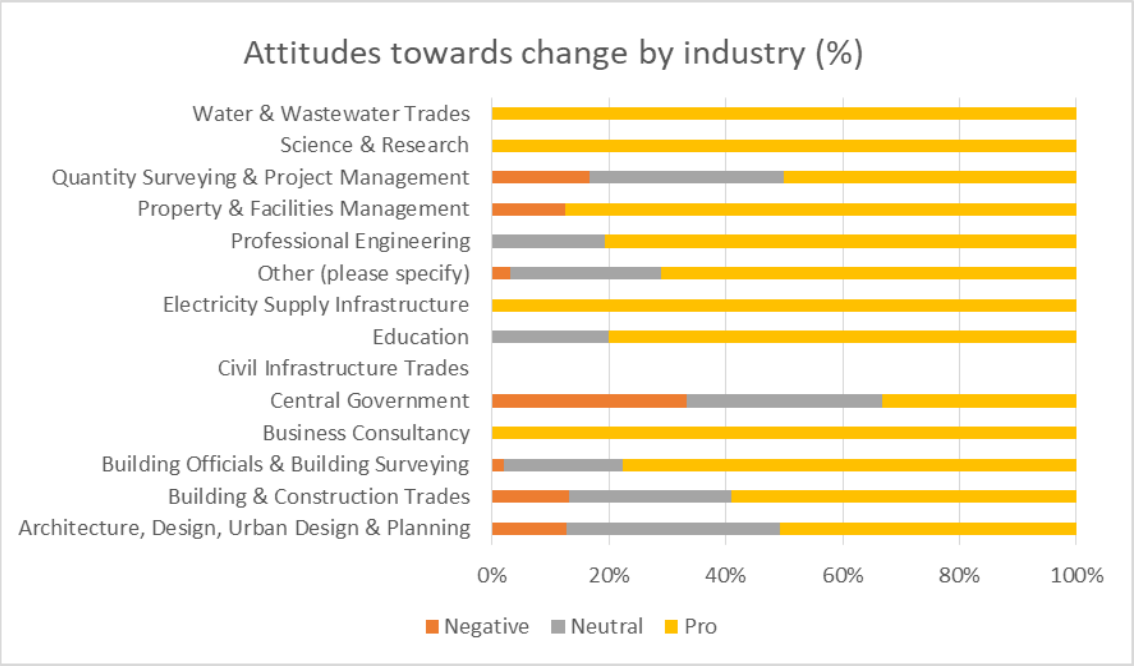

Figure 2. Respondents' attitude to change by industry.

Individuals were asked to rate other sectors in relation to their attitudes towards change. The following are seen as being accepting of change – science and research, land surveying, education, consultancy and architecture.

Water trades, property management, electricity supply, government, building trades and building officials are perceived as being the most resistant to change.

Attitudes towards change were also analysed by other demographic factors. Figure 3 shows companies with no employees (i.e. single operators) were the most negative towards change and the largest companies the most positive towards change.

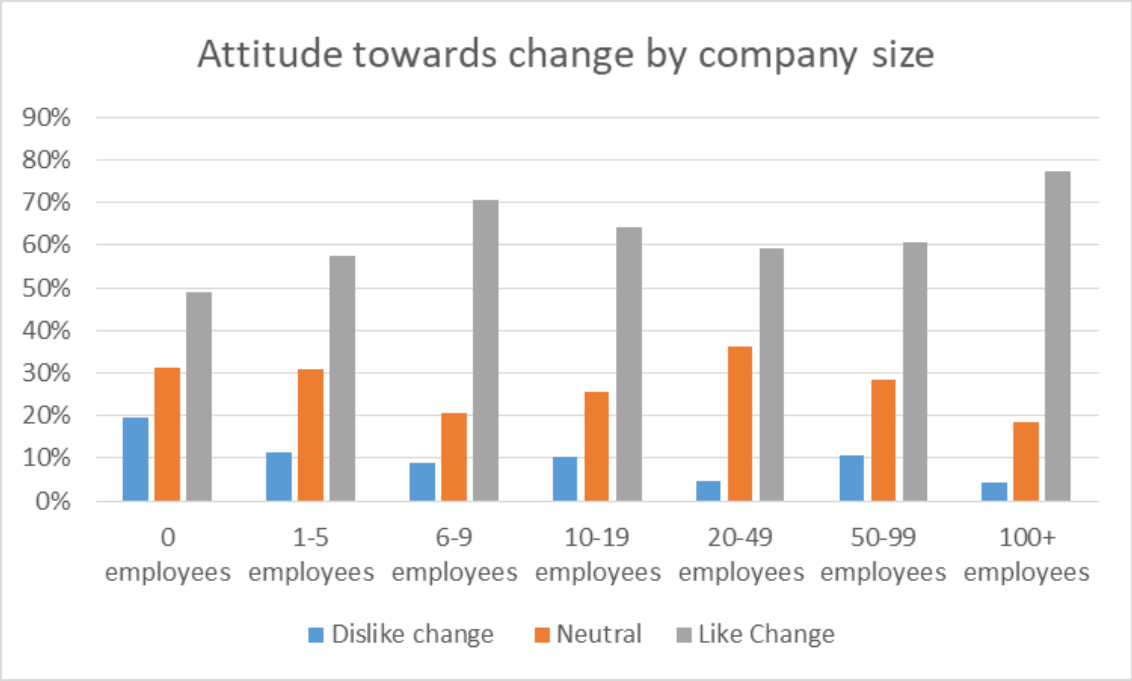

Figure 3. Respondents' attitude to change by company size.

When analysed by position in their organisation, it can be seen that executives are more positive towards change while sole traders are more negative (Figure 4).

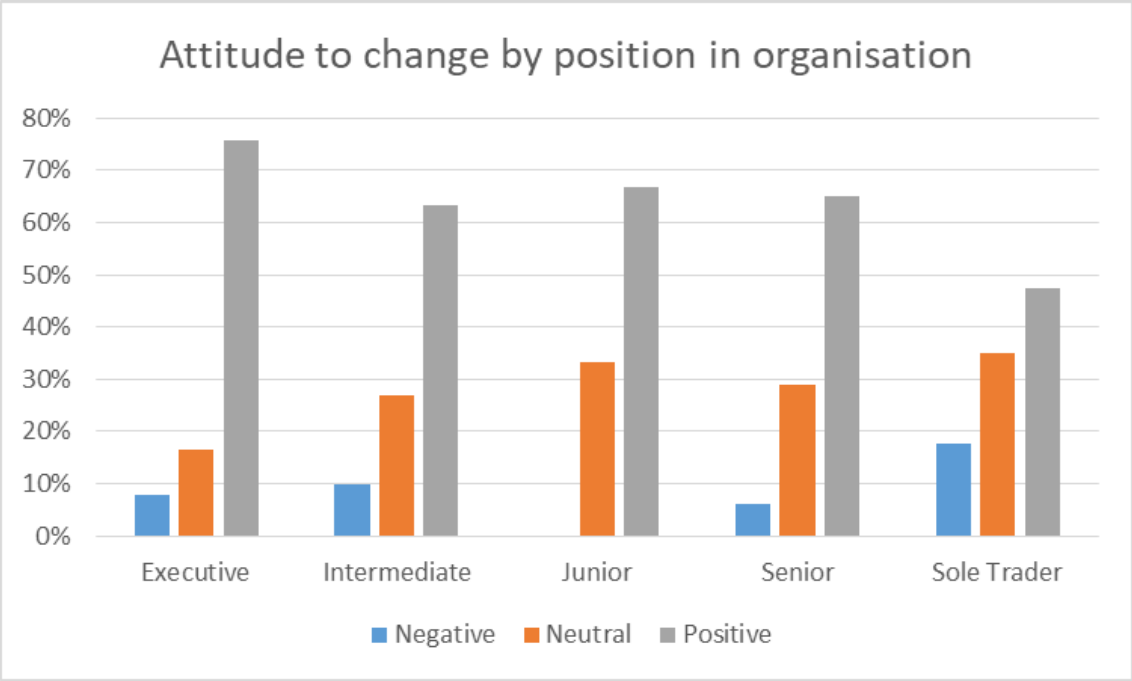

Figure 4. Respondents' attitude to change by position in organisation.

Companies at the extreme ends of value reported the most positive attitudes towards change (Figure 5).

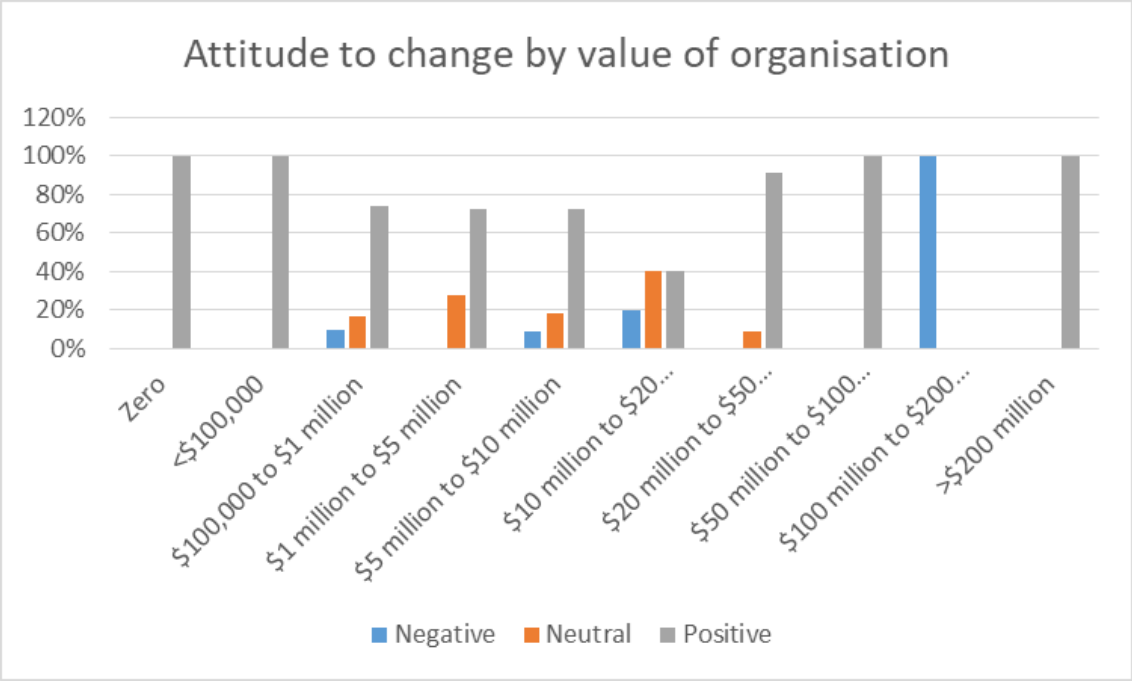

Figure 5. Respondents' attitude to change by value of organisation.

When type of company was considered, NZX-listed companies were the most negative towards change (Figure 6). Not-for-profits and incorporated/LLC were the most positive.

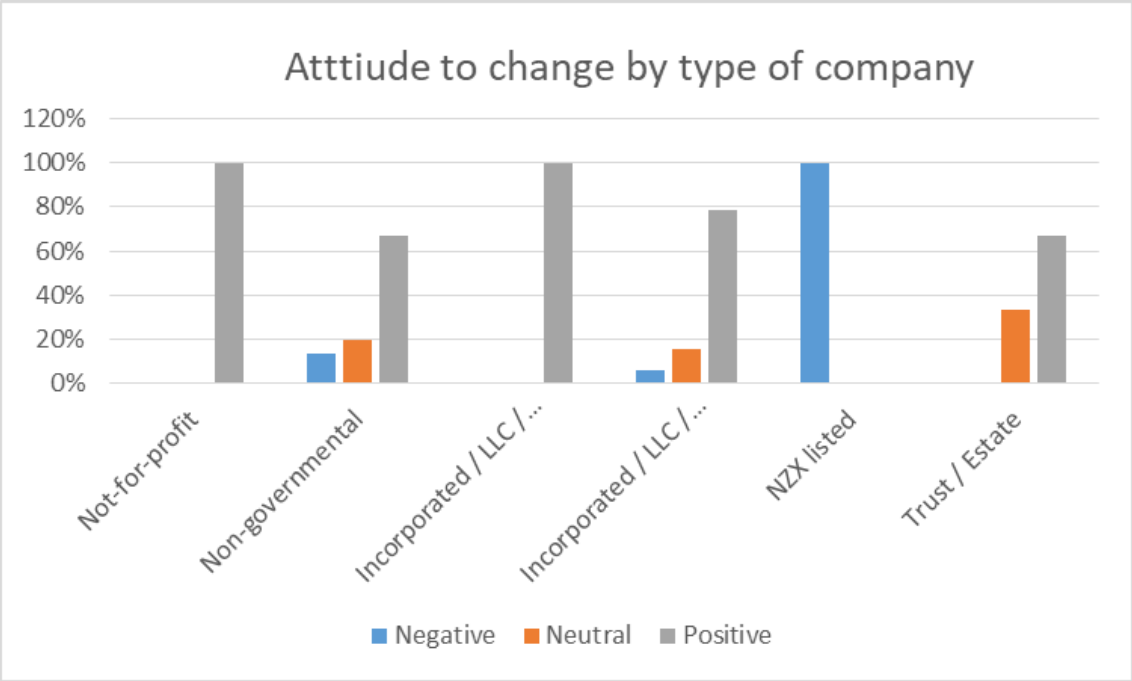

Figure 6. Respondents' attitude to change by type of company.

4.5 Perceived barriers to change

Respondents were asked to provide their view on the barriers to process and technological change in the industry (Figure 7). A total of 397 comments were received. Responses were around the main themes of:

- red tape, regulation, council processes (140)
- cost (71)
- careless attitudes, laziness/risk aversion (38)
- knowing about new things/education/skills (34)
- risk and liability (25)
- acceptance of/confidence in new things as being good/reliable (22)
- lack of guidance/leadership (15)
- age of people in the sector (13)
- support for new technology (IT) from suppliers/tech usability (12).

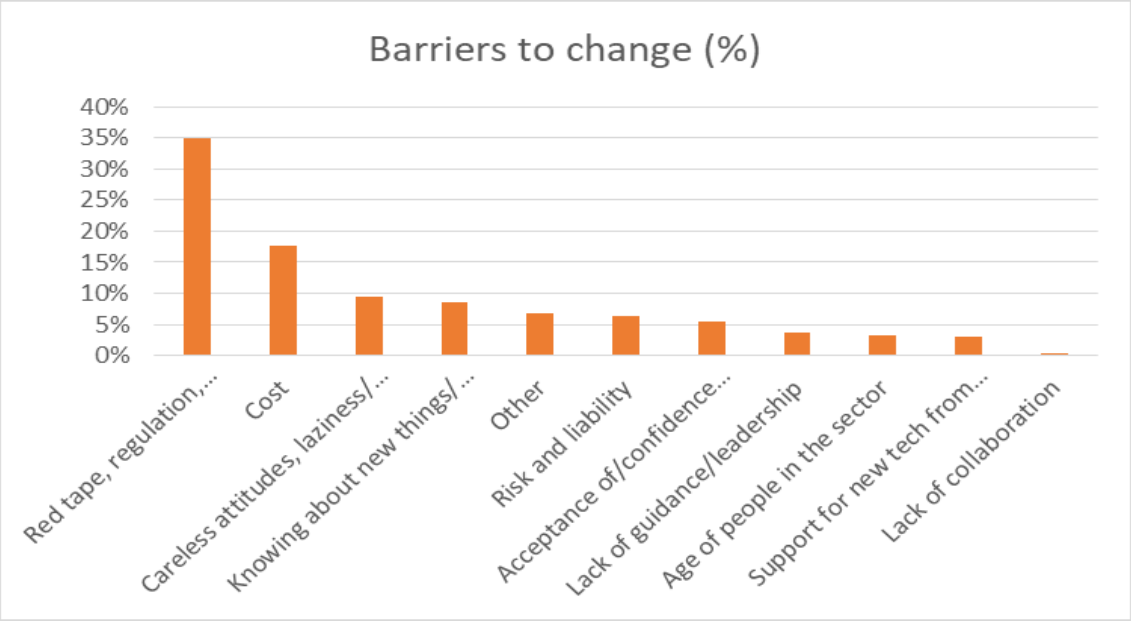

Figure 7. Perceived barriers to change.

The single most often cited barrier to change is regulation.

> Complexity of Building Standards and code, lack of flexibility to consider non-traditional building practices.
>
> Red tape[1] and reporting back to the high and mighty.
>
> Slow processing by Council for RC & BC.
>
> Totally excessive compliance rules and regulations.
>
> Local council officials' reluctance to change and accept anything new.

[1] This term is reported as it has been used by our research participants. It does, strictly speaking, have a specific meaning in relation to the military of the 19th century. It has come into common parlance as meaning bureaucratic delays and processes that are not seen as being either important or useful to some.

The comments on regulation as a barrier to change were analysed by occupational type. Of the 140 comments reported in this theme, 32% came from those in the architecture, design, urban design and planning group and 27% from the building and construction trades. Overall, nearly half (45%) of all the comments on barriers to change came from those who identified as senior managers in their organisations. This likely indicates their relatively high exposure to these barriers. An analysis of the location where the respondent works shows that almost all the comments on barriers came from the three largest metropolitan areas – Auckland (27%), Canterbury (17%) and Wellington (19%).

These comments are expressions of a level of frustration at the current compliance burden, which is seen as a barrier to change and innovation. Several comments noted that current health and safety compliance is also a burden that stifles innovation. There is a view that government is not providing the leadership required to support adoption of change.

> Government – there is no leadership.

There is also some frustration from regulators.

> Designers who constantly fail to identify non-compliant and rectify issues when identified on their applications and relying on council to provide a list of non-compliant items for them to address.

Cost was also cited regularly as a barrier to adopting new ways in the areas of:

- costs of adopting new technologies (IT)
- costs of software and training
- liability costs.

Specific comments included:

> New Zealand prices for technology are a rip-off.

> It costs us in terms of time to become familiar with any new changes.

When analysing the comments relating to regulatory barriers in more depth, analysis shows those comments came from people in the following sectors (n=126):

- Architecture, design, urban design and planning (56).
- Building and construction trades (37).

This was similar for comments regarding cost as a barrier to innovation as follows (n=70):

- Architecture, design, urban design and planning (31).
- Building and construction trades (16).

Other barriers mentioned consistently were:

- lack of guidance, lack of support for new tech from suppliers, not enough training in new ways, lack of leadership (47)
- careless attitudes, laziness, just not liking change, inertia, conservatism (37)
- risk and liability (30)
- acceptance of/confidence/certification for new things as being good/reliable/safe/standards (21)
- age of people in the sector (13)
- knowing about new things (13).

4.6 Enablers of change

Participants provided 165 responses to this question.

When asked about the enablers of change, there was a common view that cost, pricing and profitably are the most important enablers to adopting new ways of working in the industry, with 35% identifying this as important (Table 2). This was followed by the view that new products are also potentially significant enablers of change (21%) along with technology (10%).

Table 2. Enablers of change (n=165).

Enabler		Count	Percentage
Pricing, low cost, profitability		59	36%
New products/ better products/ cheaper products		34	21%
Technology		17	10%
New designs		9	5%
Access to better information/ education		8	5%
better informed clients		7	4%
Modularisation/ pre fab		7	4%
BIM		6	4%
Collaboration		4	2%
Access to NZ made products		4	2%
More use of e-services		3	2%
More competition		3	2%
BRANZ		2	1%
Regulatory, legislative or accrediation changes		1	1%
Fewer liability concerns		1	1%
		165	100%

4.7 Influences for change

Respondents were asked to identify who or what influences positive processes and/or technical change. Respondents provided 194 comments. The most common response was that legislative, regulatory and BCA change is likely to be the most powerful enabler of change with 50 responses (Figure 8).

The next three most common responses were:

- legislative, regulatory, BCA leadership (50)
- education, information, communication, cooperation (24)
- BRANZ (23)
- industry leadership (23).

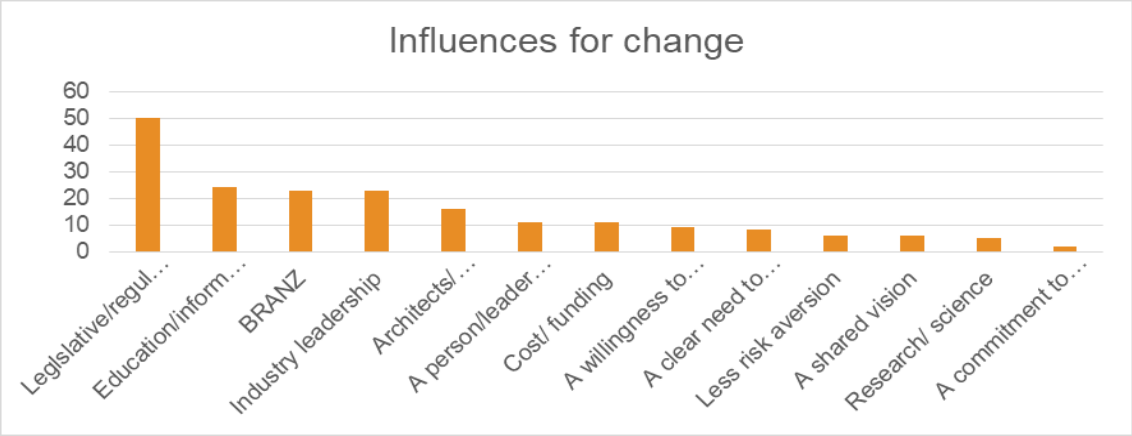

Figure 8. Influences for change (n=194).

4.8 Acceptance of or resistance to change

Respondents were asked to provide their views on where in the sector they think there is the greatest acceptance of/resistance to change in terms of process change and technological change (Figure 9).

Figure 9. Acceptance of/resistance to change (n=413, N=423).

Perceptions are that the greatest acceptance of change is in the architecture and science and research sectors. Most resistance to change is perceived as being in the building officials, building trades and government sectors.

4.9 Reasons for resistance to change

Respondents were asked what makes them resist change, providing 278 comments (Table 3). The most common responses were:

- it costs too much to change (17%)
- change is not always thought through/properly tested (13%)
- change can be hard to push through with government (13%).

Comments related to cost often centred around making an investment where there is no demonstrated benefit.

> If it's going to take an excessive amount more time or money for little or no benefit.
>
> Fear of the unknown. Easy/safer to stick to my knitting rather than learn a new way.
>
> Some change is stupid – impractical.

Table 3. Reasons for resisting change (n=278).

Reasons for Resisting Change	Count	Percentage
Costs too much to change - sometimes with little benefit	48	17%
Change is not always thought through properly/ tested	37	13%
Change can be hard to push through with government/ bureaucracy	36	13%
Information/ education	24	9%
I don't see value in the change/ is it for change's sake only?	22	8%
Some change is stupid/ impractical	20	7%
Risk	18	6%
I don't need more work/ don't have the time for new things	17	6%
How do I know it will be any better/ be of any value or benefit?	17	6%
Negative attitudes	11	4%
Wanting to stay with what you know works	11	4%
Change can be too complicated	8	3%
Overloaded with change	3	1%
Changes sometimes don't work for us	2	1%
I hate being forced to change	2	1%
Dealing with older people	1	0%
I need time to be sure	1	0%
	278	100%

4.10 Biggest change needed

Respondents were asked where they think the biggest change is needed. Significantly more respondents (38%) identify the area of regulatory and consenting change as being the biggest area where change is needed (Table 4). Education/upskilling in the sector is the second most common theme (15%).

Table 4. Where the biggest change is needed.

Where the biggest change is needed	Count	Percentage
Changes to the regulatory system/how government, BCAs and MBIE work	110	38%
Upskilling in the sector/more education/better access to information	43	15%
New and better products/prefab/R&D	25	9%
Changes to Building Code/standards	24	8%
Improved communication and information about change	18	6%
More positive attitude to innovation	18	6%
Interoperability and access to IT systems	12	4%
Collaboration	9	3%
Improved supply of cheap, quality materials	8	3%
Changes to the liability framework	6	2%
More accountability at all levels	6	2%
Making innovation affordable	3	1%
A NZ-wide electronic consenting system	2	1%
Ability to build outside the current compliance system	2	1%
A new home warranty system	1	0%
Reduce costs of innovating	1	0%
	288	100%

Most of the 110 responses that identify regulatory changes as a top priority area for change come from the architecture area (37%) followed by 30% from the building and construction trades (Table 5). It is interesting to note that 15% came from building officials and building surveyors. The inference can probably be made that building officials are as frustrated by the systems they work with as those in other parts of the sector.

Table 5. Top priority given to regulatory change by sector (n=110).

Changes to the regulatory system as priority	Count	Percentage
Architecture, design, urban design and planning	41	37%
Building and construction trades	33	30%
Building officials and building surveying	17	15%
Business consultancy	0	0%
Central government	0	0%
Civil infrastructure trades	0	0%
Education	0	0%
Electricity supply infrastructure	0	0%
Other (please specify)	8	7%
Professional engineering	5	5%
Property and facilities management	1	1%
Quantity surveying and project management	3	3%
Science and research	2	2%
Water and wastewater trades	0	0%
	110	100%

Respondents were invited to make specific comments relating to this question. Comments focus on:

- the lack of effectiveness in the work MBIE does, for example, “central government, ministers with no grasp of reality in our industry”
- how consenting is managed, for example, “consents should be simpler, easier and cheaper to get”.

Difficulties in working with councils is also a common theme.

> Council. 50% of my work in the last few years has had issues with stamped approved for construction working drawings, client has a limited knowledge of the construction industry and consenting process, builder on site is responsible for all the hold ups and issues the engineers, architects and Council have missed, client won’t pay the final account.

> Council. The culture needs to be changed and they need the tools to make decisions and accept new products. The poor inspector gets to site and has no idea what’s going on.

A perceived lack of consistency between councils is mentioned, for example, “consistency of the forms, systems, templates, checklists and procedures used by BCAs”.

Respondents also described how government stifles innovation.

> Legislation [is] holding innovation back.

> Most definitely in central and local government. Rules they have little or no value that don’t make sense, and if we need change in some area the process of change is too slow and cumbersome.

> Remove MBIE or create something that produces positive guidelines across the industry ... create an independent body (free from political gains, individual egos and cannot be bought by the big construction companies) to lead the construction industry.

4.11 General comments

Asked to provide any general comments they wished, respondents provided 151 additional comments. Many of these are restatements of earlier comments, and many relate to the need for consenting and regulatory improvements to enable any adoption of new ways in the industry.

> As it is licensing has brought the industry to its knees and it’s losing all the experienced craftsman and technical expertise. The whole thing is politically driven nonsense and I for one simply can’t wait to retire, it’s not worth fighting it!!!

> Councils are the weak link in the construction and project delivery process. We need a robust and professional private building certifier option to streamline documentation and consenting, enabling these processes to be concurrent and collaborative, not consecutive and adversarial. Documentation needs to move toward electronic platforms, away from paper based.

> Forgot about one barrier to innovation – building controls, e.g. NZBC. Does not encourage innovation in design at all from a building services aspect anyway.
>
> I'm not happy with the whole of the building sector and the way things are going. Soon I will need a licence to own a hammer.

There are also some strong views of risk aversion and its negative impact on the industry now and in relation to adopting new ways in the future.

> In a risk-averse, litigious environment it is not always easy to effect positive change.
>
> Everyone is covering their arse so much that it is very expensive to produce a decent set of plans – maybe get rid of DIY shows like the block and do a show on the design process/compliance/actual on site building techniques and expert advice – this will better educate the general public what is actually involved when constructing a building and real timeframes that should be expected.

All comments received were grouped by theme and are attached in Appendix C.

4.12 A final word

Many respondents engaged enthusiastically with the survey. While there is a clear and reasonably consistent level of frustration expressed, there is also a sense of optimism about what the future could look like. There is a clear commitment from many respondents to doing their best for the people of New Zealand by building quality, affordable housing.

> We live in dynamic times with ever increasing pressure to do things faster and more cost effectively. What we should never lose sight of is quality.

And, finally, there is a plea for this research to have a positive impact on the industry.

> I fear that the contents of my submission will fall on deaf ears, or blind eyes. Prove me wrong!

5. Workshop findings

5.1 Methodological approach

A series of workshops were held in five centres around New Zealand:

- Queenstown
- Christchurch
- Nelson
- Wellington (2)
- Palmerston North
- Auckland (2)

Additional workshops were added in Auckland and Wellington to meet demand. Workshops could be delivered to a maximum of 25 participants. Although initial interest was high, attendance at workshops rarely matched the numbers enrolled.

A total of 85 participants attended workshops. The largest numbers attended the workshops in the main centres. In total, 23 participants attended the two workshops in Auckland, 22 participants were spread across the two workshops in Wellington and 18 attended the Christchurch workshop. Workshops had fewer attendees in the smaller centres of Queenstown (5), Nelson (10) and Palmerston North (7). Despite attendance being low in some areas, participants entered into discussions wholeheartedly. Views were divided on whether more attendees would have made the exercise more worthwhile, as some participants voiced that smaller discussion groups were more conducive to airing concerns and sharing views.

A diverse group of professionals attended the workshops. They ranged from individuals involved in the building industry as builders, architects or designers to representatives of local bodies (building inspectors), government agencies and representatives of suppliers and national professional organisations.

The average age of participants was 52. Most identified as New Zealand European/Pākehā (94%). There were two participants who identified as Asian, two British and two Māori, one Middle Eastern and one who identified himself as ‘mixed’.

Fewer than one-fifth of attendees (15 of 85) were female. Only one of these women was a tradesperson (apprentice builder). The remainder were designers/architects, building control officers or involved in management or supervisory roles.

Attendance at these workshops was broadly reflective of the industry as a whole, with participants from a wide range of occupational areas.

The content of the workshops broadly focused on the aims of the research, addressing the following issues:

- Do we need to change?
- What change is needed so the sector can adopt new ways of doing things?
- What are the priority areas for change?
- What are the barriers to change?
- What are the enablers of change?

5.2 Do we need to change?

The core question posed to workshop attendees was whether or not they feel that change is needed in the building and construction industry. There is a general consensus that this is indeed the case and that it will not be an easy task.

The view is that, while change is needed, it must be “the right change at the right time”.

5.3 Where change is needed

Evidence from workshops mirrors views expressed in the online survey. There is a level of frustration in the industry regarding how it currently operates and how it could operate more effectively and efficiently. Some of the barriers to change are seen as relating to compliance/regulatory issues. There are also issues related to human nature and the inherent culture surrounding particularly the housing industry in New Zealand that need to be addressed. These are issues for which there is no quick fix or easy solution.

5.4 What are the priorities for change?

Workshop participants broke into small groups to discuss issues related to priorities for change and barriers to and enablers of the change process.

Changes seen to be crucial for the wellbeing and maintenance of the building and construction industry in this country again reflect those reported in the online survey. Issues seen to be of priority over the next 10 years include:

- quality of training and level of competency
- addressing the overcomplicated and burdensome nature of compliance/regulation – reduce layers of regulation and ‘clipping the ticket’ processes
- streamline product documentation
- direct government contact with industry
- new construction methodologies and technologies
- education of end user (including addressing expectations of clients)
- more collaboration – less working in silos
- industry consultation/engagement
- legislation to raise minimum standards
- procurement issues – cost materials, monopolies, innovation
- structures of liability and risk.

There was often no clear delineation between these issues, which were invariably intertwined and discussed both in relation to barriers to changes in the industry and how these could be overcome to drive innovation. Participants feel that, while other industries in New Zealand show change and productivity (particularly the motor and electronic industries), the building industry is characterised by stagnation.

5.5 Barriers to adopting new ways

What workshop participants report around barriers to innovation and adopting new ways fall broadly into five overarching categories – cost, compliance, risk and liability, rate of change, training and skills and issues with government.

5.5.1 Cost

Issues of cost pervade the industry – the cost of materials, the cost of meeting timeframes, the costs related to compliance, regulation, risk and liability. Last, but by no means least, the cost of taking on apprentices to bolster flagging numbers of skilled tradespeople can look like a financial risk to a small business.

The existing duopoly in the supply of building materials is seen to stifle innovation in product and systems usage and drive up costs.

> Carter Holt Harvey and Fletchers control supply and prices. They are making a margin. It doesn't help the industry. New Zealand timber is cheaper in Australia than here.

The industry is driven by cost and the tendency of consumers to want the best value for money despite the fact that the cheapest tender or type of material is not always the best. This forces builders into situations where they are competing in a free market environment where quality is not always valued over price.

> The big players control the industry (materials and services) – NZers have this DIY mentality – inherent – "if I can do it myself it should be cheap." Kiwis don't want to pay for quality which includes a layer of cost for health and safety issues.

It is generally felt that, although the minds of those in the building industry are receptive to change and see its importance for the wellbeing of the industry.

> The focus is on does it affect the back pocket?

There is a consensus that:

> Cost drives the industry – pressure always falls back on builders to build cheaper.
>
> Over last few years we have been hearing from government and industry that we need affordable houses. But the industry can't make money – we're all competing with each other.

5.5.2 Compliance

The complicated 'tick box' nature of compliance and time delays in the process in various parts of the country was vigorously debated. It is felt that the degree of oversight is cumbersome. It is also believed that those responsible for building inspection and regulation are sometimes characterised by a 'tick box' mentality underpinned by a general lack of knowledge of the industry. This could result in time delays due to the requirement for numerous on-site inspections. Such factors existing alongside streamlined budgets and tight timeframes can lead to the fracture of previously good relationships.

> The building inspector used to be a colleague. Now they are policemen and we are scared of them. But there is a skills shortage – and inspectors are not able to use their judgment.

Compliance can also relate to covenants placed by property developers on the requirements for building on the parcels of land in a particular development. The impacts of these are seen to affect innovation in building – size and types of houses

are often prescribed and can prevent maximum usage of parcels of land. It ties in with aspects of the Kiwi culture and expectations around the nature and size of bespoke housing and accompanying plots of land. This in an environment where the availability and affordability of suitable parcels of land for housing development is scarce.

Again, we come back to the overarching issue of cost.

> Too many people clipping tickets on the way through [compliance] adds to the cost.

On the other hand, there was a clear message from those working in the compliance area that they are under-resourced and expected to be managing a workload that is not realistic. This causes delays to processing of applications. There was also a message that the quality of consent application varies, with some being of poorer quality and requiring significant input from officials. This, again, delays processing.

5.5.3 Risk and liability

Issues related to compliance and regulation are invariably tied to the concepts of risk and liability and where these lie within the industry.

> Joint and several liability [leads to] a climate of risk averseness.

The placement of risk and liability within the industry has led to an environment that is described thus:

> No one wants to sign anything – they don't want the liability. In Perth, a builder checks and signs off the build. We have a paper trail – so if it all goes wrong, there is someone whose head we can put on the block.

> Onerous consent process; issues predating 2004 Act have resulted in a pendulum swing in the opposite direction – systems, policy, procedures now risk averse. [The] environment is difficult to work in – no-one wants to make a call, regulation is "over the top" – gives you the feeling of being a "Battery Hen".

In essence, everyone wants to limit their level of liability.

Participants voiced that over-regulation and risk-averse practices generate a climate of fear and result in resistance to innovation and new ways.

5.5.4 Rate of change

The rate of change within the industry in terms of new technologies and the use of technology has profound effects, particularly on small enterprises.

> Technology is changing faster than you can implement it. What is in vogue today is obsolete tomorrow.

There is a cost attached to this both in the purchase of technological tools and the time needed to be invested in upskilling to become familiar with their purpose and operation. This is an ongoing process and works against meeting the budgets and timeframes attached to the building process. Suppliers of technology are also seen to be lax in providing information/support for new products. Comments were made around the resistance of older tradespeople to change of this nature and the attitude that tried and true systems/materials were the safest, there is no need to change. And of course, again, there are the issues of time and cost.

> One reason new things cost more is that you have to train someone to use them. People just want to keep doing what they have always done.

Where younger workers are seen to be proficient, particularly with the use of smartphone technology, it is noted that they often lack the skills to think laterally 'outside of the box' once they had the information they were given.

Innovation is sometimes seen as a luxury that individuals and small companies cannot afford. Comments were made that the industry works on very small margins, and it is a short step to insolvency, particularly for smaller enterprises.

Not only is innovation and change an expensive business, one has to be aware of what is available in the marketplace to be able to consider whether or not it is worth utilising. The rate and diversity of change has also resulted in impediments to working collaboratively, affecting the ease of sourcing and sharing information.

> Sharing information has got harder!! We may be using different software. This is a huge barrier to change.

> Often you have to hunt for things. You spent time making sure you have the info you need. We used to work off printed plans. But now nobody has got the plans. This is an upskilling thing.

5.5.5 Training and skills

It is universally agreed that the future of the industry depends on a supply of new blood and the upskilling of those already in the industry. It was often voiced that there is currently an ageing workforce with many nearing the age of retirement. There is a concern that this will result in the loss of skills and knowledge that characterise this group. This necessitates ensuring that the wealth of knowledge held by tradies who had undergone what is seen to be a more rigorous training process is not lost.

> I was lucky – I was trained by the old MOW [Ministry of Works] – some of the best training in the world. We need to bring back training through government departments.

> There are mainly young people at BRANZ seminars – we are losing the voice of experience.

It was generally observed that the view of the industry as a dead-end job with no career path affects the quality of applicants for courses. Pre-apprenticeship courses are seen to be characterised by "lowest denominator in and lowest denominator out" – those who had not thrived in the school system. This is definitely an issue in an industry that is becoming increasingly technical regulated by a system becoming more difficult to manoeuvre due to risk averseness and issues of liability.

> [The] regulatory system is getting harder – [it's] tougher to comply. [We're] getting trainees with low education and the industry is getting more technical. They are illiterate – we need to teach them literacy and numeracy. "

This points to the paradox of young people being competent users of smartphone technology but lacking in some areas of basic education.

> Problem solving skills are missing [in] so many people on sites on cell phones, particularly the younger ones – can use technology but can't problem solve.

Although there are high enrolments in pre-apprenticeship courses, this is accompanied by high attrition rates. Another factor mentioned is the variable levels of training across the country. This means that, at times, trainees turn up on worksites without the skills they have theoretically attained during the 'skills badging' process.

> Contract builders (group home builders) put houses up fast. Builders have to run to make money. This also means you don't have time to teach an apprentice, they have to watch and (hopefully) learn.

> NZQA sets curriculum – but they are not keeping up. They are training for how it was done 10 years ago.

In some respects, the employment of innovations such as prefabricated structures can work against producing graduates grounded in the basics of the building trades.

> Pre-fab nature – good for time frame but not good for knowledge on site. We have carpenters who know how to assemble not construct. They don't know the basics.

5.5.6 Issues with government

The foundation underpinning all of these interlinking factors is invariably the complicated nature and duplication of central government processes. These are seen to be functioning in silos driven by risk and liability averseness.

> Central government does not collaborate with anybody!! Too slow to change. The system is meant to allow innovation – but it actually slows everyone down. Duplication of information to be provided. We often have to apply for consent for a house we have already consented last year. The Building Act has not caught up with technology.

The perceived apathy and slowness of the wheels of government was also referred to.

> Inertia in government – it takes so long to get any change!!

These shortfalls are seen to be compounded by the lack of understanding in government of the industry, which results in to the formulation of policy by those with no expert knowledge.

> Those at the top don't have particular knowledge but are running the show.
>
> [All are] working in silos – everyone is working individually – MBIE, government, councils – at almost every level there is a lack of communication.

Not only are agencies such as MBIE difficult to engage with, those who have been involved in consultations feel their suggestions fell on deaf ears and that outcomes were a foregone conclusion.

Such problems with communication were seen by some to be compounded by the fact that there is no one industry-based body/individual that speaks for the industry as a whole.

5.6 Enablers for adopting new ways

A number of suggestions were made to address the barriers that are seen to be hampering the productivity, growth and regulation of the building and construction industry in New Zealand. As one participant said, there is a need across the board for "more flexibility please".

There is a view that BRANZ has a pivotal role in improving things.

5.6.1 Compliance and regulation

Opinions of participants clearly indicate that more flexibility is required in the regulatory environment and compliance area. An increased use of technology in this area would result in streamlined processes. It was repeatedly stated that BCAs need to trust the industry and its practitioners.

It was also expressed that the requirements stipulated under covenants need to be regulated to prevent a focus on building larger bespoke houses and to make best use of dwindling supplies of land. Building conditions should be governed by the needs of communities, not developers.

Incentives could be offered to developers to change the culture – tax breaks, for example. It was also suggested that subsidies should be offered "incentivising good energy-efficient designs – to reduce demand on natural resources".

Developers are also considered to have a role to play around issues of the need for a change in Kiwi culture. This is earlier referred to as a barrier to changing the types of houses we build.

> Changing culture takes time – getting people around to wanting something different needs to be cost effective – developers need to force the issue.

It was suggested that practices of simplification and standardisation could aid in overcomplicated compliance and regulation processes – for example, simplify and clarify national standards and processes, simplify and standardise contracts and consent documents. Also that there should be "one BCA to rule them all".

5.6.2 Risk and liability

There is seen to be a need to change the joint and several liability framework that encourages a climate of blaming. Those in the industry need to work together for a desired outcome rather than identifying where to lay blame.

Workshop participants suggest that risk needs to accompany reward and, particularly in the case of the development of new products, the producers should shoulder liability.

5.6.3 Cost and innovation

It is perceived that a more proactive approach needs to be taken to support new ways of construction – prefabrication and medium-density housing. The latter will address both issues of cost and land availability and affordability.

> MDH has to be considered – doesn't need large sections – good for those trying to get on the property ladder.

The use of modular housing would be an efficient way of addressing the current housing deficit.

> Push modular construction – push it strongly to address housing deficit.

Several participants voiced concerns about levels of information available to potential clients.

> Members of the public what do they want? Building a new house is a daunting project we need to ease the process for the consumer – from their point of view.

All involved need to be on the same page and working collaboratively. Sharing information is viewed to be crucial for this.

> Educating clients, markets, designers – so you are all heading in the same direction. Everyone needs to communicate and understand each other.

It is suggested that creating a central repository for product technical information will enable information to be sourced efficiently and address the current fragmentation of this process. All such documents need to be written in plain language rather than relying on technical terminology.

Creating a competitive environment for the supply of materials is thought to have the potential to lower prices, which are invariably driven up by those who currently have a monopoly over this process.

5.6.4 Training and upskilling

The uncertainty created by the cyclical boom and bust nature of the building industry contributes to low investment in skills and training by the sector. During a recession, the industry tends to lay people off or bring in apprentices – then there is a growth cycle like we have currently and a shortage of tradespeople. The workforce is ageing, and workshop participants voiced their concerns about this. There needs to be a way to retain the wealth of experience held by this group.

> Continuing education/peer to peer learning is needed – all need to be involved. Older members need to mentor younger members.

As one succinctly remarked:

> Experience is that shit you get just after you need it.

Problems were seen to exist for those with licensed building practitioner (LBP) certification, particularly around requirements to maintain levels of ongoing education/use of new products.

> LBPs are struggling to keep up their licence. For older builders – it is 'too hard'.

> Keeping LBP points – it is a struggle. Because I am in commercial building.

> LBPs are a dying breed – and those we have are older.

However, the main issue seen to be affecting the shortage of tradespeople is how the industry is perceived.

> We need trade related courses in secondary schools (metal work, carpentry) – there is a push towards university not trades – there is no direct pathway to trades – parental guidance/encouragement is lacking.

A clear career pathway is needed for those entering the trades, with frameworks to achieve this.

> There are no incentives these days to do an apprenticeship.

The costs of barriers to training also need to be addressed. It was suggested that this burden could be eased for potential employers.

> We need subsidies for apprenticeships to encourage growth in this area.

The question of learning institutions delivering to varying levels and teaching/assessing NZQA skills differently affects the level of supervision/mentoring required on site. As mentioned previously, younger members of the industry are all familiar with smartphone technology but need guidance on how to interpret the information they access.

> Can all access apps – [they] need to sit down with guys showing them skills not just read on mobile phone – they don't learn how to put this knowledge into practice. Most trainees not interested in reading to learn.

It was suggested that pre-apprenticeship courses should teach building science – reasons behind choices made, what is best in which situation, while keeping in mind how this is achieved to avoid information overload.

The issue of encouraging more women into the industry is one that invariably arises. There are fewer females in the building industry than there are in other related trades, such as plumbers and electricians. However, it is not unusual for women to be engineers, architects or designers.

> [I] have seen a lot of young women recently at BRANZ seminars, usually sub-contractors electricians, plumbers, engineers etc. They may have degrees (qualifications) but don't get site training.

There are seen to be benefits in employing women, they have a finer eye for detail, are hard working and tend to read more. However, building site culture and the all-male environment often works against women wanting to be involved in the industry – it is often an isolating experience for them. These issues will need to be considered in order to encourage more women into the building and construction industry.

5.6.5 Quality and working collaboratively

There is a view that the nature of working on a modern building site with the involvement of specialist trades/subcontractors would benefit from more overview/project management.

> Segmentation [leads to] decrease in quality. No whole-build responsibility. Residential build: segregated. One does the roof, one does the floor. Need a good site foreman. This is a response to supply and demand pressures. The system does not encourage quality. Minimum standard. We will not have Project Management skills in the future. We have guys trained in silos.

Working collegially with subcontractors on site leads to better outcomes.

> Quality is assured when you know each other's work and can work collaboratively to ensure good outcomes.

However, this does not always happen.

> Sub-contractors don't work collaboratively, only interested in their part of the job. Project management often not joined up – eg plasterers wanted house cleared to do their work don't want any other subcontractors on site.

This again points to the importance of site oversight/project management.

5.7 Engagement with the workshops

All workshop participants were asked to rate and comment on the workshop they attended, as well as provide information about themselves. Overall ratings indicate a high level of engagement in all workshops (Figure 10).

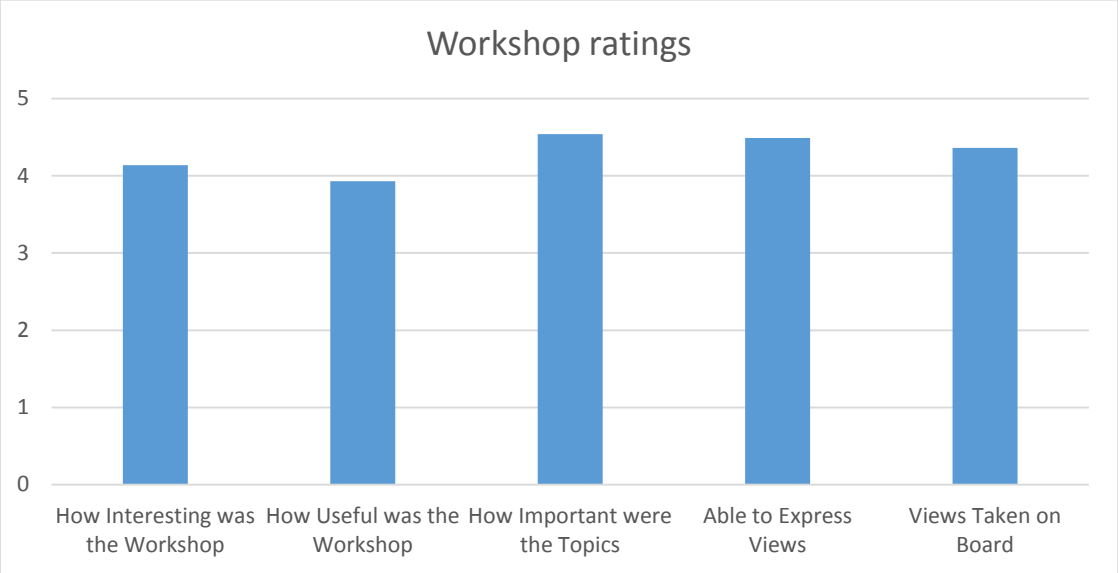

Figure 10. Workshop participant ratings.

Participants rated the workshop as 4.14 out of a possible 5 when asked how interesting it was. When asked how useful it was, the average rating was 3.93, and when asked how important the topics under discussion were, participants gave an average rating of 4.54. In response to whether they were able to express their views, the average rating was 4.49. When asked if their views were taken on board, the average rating was 4.36.

Workshops in each area were analysed, with Christchurch ratings being noticeably more positive than other centres and Auckland's two workshops showing participants were the least engaged (Figure 11).

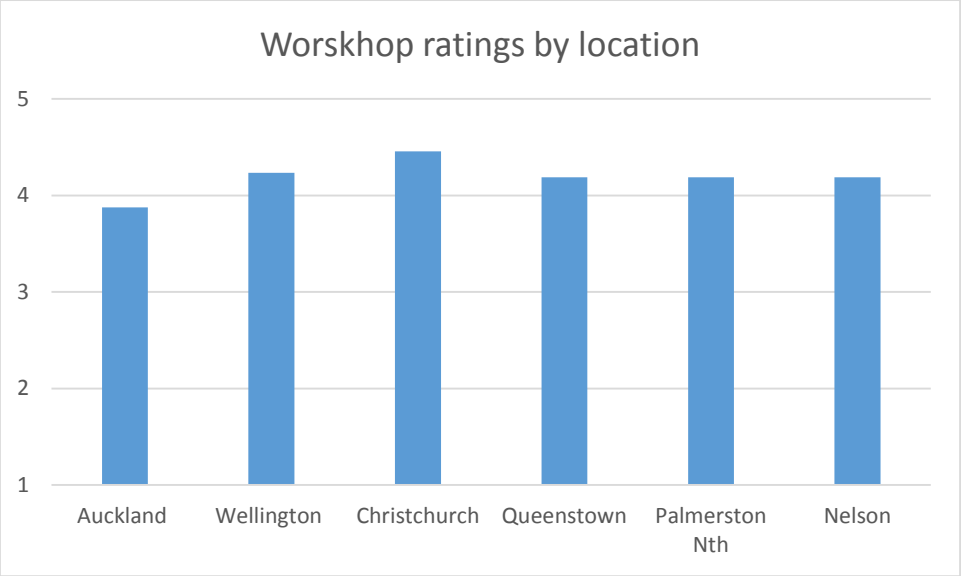

Figure 11. Workshop participant ratings by location.

5.8 A final word

Participants expressed some confusion initially about the nature of the workshops – several attendees had thought that these were forums to provide information. However, those who attended entered into vigorous discussions about issues of interest and concern.

The results clearly show that those who took part in the online survey and those who attended workshops were united in the issues of concern and the ideas for change that they expressed. This provides a clear pathway for the development of recommendations as to how the industry can move forward.

There is currently a shortage of affordable housing in New Zealand. The government's KiwiBuild initiative has been developed in answer to this. However, we also need to change the mindset of New Zealanders towards smaller, affordable homes. This is no easy matter as it is the opposite of the concept of the half-gallon, quarter-acre pavlova paradise considered to be the New Zealand dream.

6. Research findings

The research findings are based on the views of industry, as reported to BRANZ via the online survey and the workshops, and a review of relevant literature.

These findings represent what industry thinks about itself and what the literature says in relation to the five key research questions:

- Do we need to change?
- What change is needed so the sector can adopt new ways of doing things?
- What are the barriers to change?
- What are the enablers of change?
- What are the priority areas for change?

6.1 Overall findings

Research participants are clear, sometimes in a very strongly expressed way, that there are many significant barriers in place that mean they do not adopt new ways of doing things in their industry. A level of frustration is clear. The overall view is not only that there are few incentives to change, but there are significant and important barriers in place that disincentivise adoption of new ways.

Overall, participants in this research expressed the view that the industry is open to change in principle. While 40% of respondents in our survey indicate their attitude to change is to want to get involved, only 5% report actively disliking change. This sends a clear message that new ways of doing things will be adopted if the barriers to doing so are removed or mitigated.

Participants report that there is a will to do things better in the building and construction industry. Many participants in our research indicate an openness to new and potentially better ways of doing things. However, the barriers and disincentives meant that they usually didn't adopt new ways on offer.

What is clear from this research is that those who are in a position to influence either barriers or enablers of adopting new ways can do so – with significant impact. One of the clearest calls from participants throughout this research is for leadership in this space.

6.2 Do we need to change?

All research participants recognise that the industry can be improved and that there are new ways of doing things that can achieve this. There is very little resistance to change in principle, but participants acknowledge that new ways of doing things are often not adopted for what appear to them to be good reasons.

6.3 What change is needed so the sector can adopt new ways of doing things?

Our research indicates that there is a level of frustration regarding how the industry currently operates and how it could (and perhaps should) operate. While some of the barriers are seen as being in the regulatory context, there are other industry-wide barriers that mean uptake of new ways of doing things is low and slow.

There is a theme in our research that a change management process is required for industry. As one participant stated, “intelligent management of change is essential”. This comment identifies the need for industry to not only understand change but to understand the reasons for it and the benefits of it. Change for change’s sake is a view held by some of what is currently happening – and why it is resisted. This journey to a new way of working is one that requires buy-in from all participants if it is to be widespread and effective.

6.4 What are the barriers to change?

The findings of our research are that there are four main barriers to the uptake of new ways of doing things.

Social inertia

It is in our nature as people and societies to resist change. This may be the case even when that change is advantageous. This is clearly evident when looking into why new ways of doing things are not taken up in the building and construction industry in New Zealand. People need to clearly see an advantage to themselves and their work in changing the ways they do things.

Cost

Change often involves investment of time and money. This can be a deterrent to making that change. In the New Zealand building and construction sector, there is often pressure on both time and money due to the competitive nature of the industry. Where contracts may be won or lost on the basis of cost and time, the climate is not one that is supportive of investing time and money into new ways of doing things.

Education and skill levels

In order to adopt new ways of doing things, participants in the sector need to both understand the change and have the skills to adopt it. If these skills are not present, new ways will not be adopted. There is a clear view from participants that the skills enabling uptake of new ways of doing things, particularly in relation to IT solutions, are not present in the current workforce.

Regulation

Participants feel that the regulatory environment in what they consider to be a risk-averse industry disinclines adoption of new ways of doing things. In the New Zealand context, there is a high aversion to risk that is historical. This is not a climate in which any participant in the sector wishes to expose themselves to potential risk by using or adopting untried, untested or unfamiliar ways of doing things

6.5 What are the enablers of change?

There are ways that change can be supported and enabled.

The biggest area identified by participants in this research where change can be supported and enabled relates to regulatory settings. Easing regulatory processes (and reducing time taken with these processes) was identified as the single most important change that can take place to enable greater adoption of new ways in the sector. This is seen as being the most impactful way of enabling more flexibility and responsiveness to new ways of doing things. In such an environment, industry players would be more likely to try new things.

The second most important enabler of change is related to the cost of innovation. If new ways of doing things are to be adopted, the cost to the sector must be minimised. Few people are willing, at this time, to invest time and money into new ways of doing things where impacts are not proven to their satisfaction. A new way of doing something has to be a value proposition if it is to appeal.

Additional investment in educating and upskilling the current workforce and attracting more of the right sort of skills to the sector are also seen as having a potentially significant impact.

The matter of human nature is a harder one to change. Many in the sector simply do not see benefit in adopting new ways, particularly when they feel the old tried and true ways of working have served them well. Changing this type of attitude might be possible through a more tangible demonstration of advantages conferred by new ways. An innovation park or other such example may be an effective approach to changing this. The best way to encourage others to adopt new ways is to show them those new ways are advantageous to them, cost little and deliver clear benefits that can be clearly understood.

6.6 Priorities

There is emerging technology and systems that can make an impact on how we work in building and construction in New Zealand. Productivity and quality gains can potentially be made.

In order for that to happen, strong and decisive leadership needs to be put in place to focus on managing the industry through a period of significant change. This change needs to occur in the following areas (in order of priority):

- The regulatory environment, including how risk is managed.
- Upskilling.
- New, better products including prefabrication.
- Cost of innovation (both development and implementation).
- Collaboration.

Regulation and risk

The regulatory environment needs to be more agile and flexible to enable and encourage adopting new ways of doing things. This includes processes and attitudes. In terms of processes, use of digital devices and systems needs to be prioritised. A sleek regulatory context would mean industry can respond both now and in an ongoing way to future change and innovation. This is the single most important area needing change, according to participants. Change in this area needs to reflect a changed approach to risk. Participants are clear that risk should be associated with reward – if there is reward, the risk (or liability) should also sit there.

There are calls for the regulatory system to be simplified and standardised as a priority area for change.

Upskilling

The ability of industry to adopt new ways of doing its work is directly related to the skills available on the ground. This includes providing a clear career pathway for entrants.

Subsidies for apprenticeships are seen as one part of the solution.

Calls for changes to the LBP scheme would also enable experience in the sector to be retained. Simplifying the rules around continued registration is potentially an area for attention.

New products

Quality, proven and approved new products are seen as having potential to make a significant impact on how the industry works and what it delivers. Prefabrication and modularisation are seen as being part of the solution as well. However, some builders feel that does not contribute to upskilling, as less skill is required to assemble than to build.

Cost of innovation

This research was conducted with those in the sector who largely do the designing and building. Therefore, the comments in this area relate primarily to adopting new ways of doing things on the ground or in the planning stages. For these people, the cost of taking up new systems and processes that require investment of time and money is not attractive. In fact, it is a significant barrier.

Cost of innovation is also mentioned as a barrier to development of new products, systems and processes.

Collaboration

All participants are clear about the importance of collaborating in relation to new ways of doing things in the industry. There are clear benefits in doing so, and this is seen as a priority.

6.7 Discussion

The following summary is based entirely on what participants contributed to the research via the survey and workshops. We recognise that these are opinions at a point in time.

Using information gathered in this research, we have been able to develop a picture of a complicated industry. The need to adopt better ways of working sits in a context of lack of productivity and, to some extent, stagnation in terms of work practices.

We face a complex interplay of cause and effect factors, resulting in a system that is operating in a way preventing it from moving forward. Things are happening. There is innovation. People are having ideas. Products are being developed. Apps are being built. Organisations are talking to each other. However, the intractability of a set of other factors means that, even with goodwill, good ideas and good investment, new ways of doing things are not being widely adopted in the sector. At least, they are not being as widely adopted as they might.

The impact of new ways of doing things, while potentially beneficial to a poorly performing and stressed industry, is not realised because people may be afraid of it and sometimes don't understand it. Not only that, they cannot – or will not – afford it, nor do they have the skills to use it and they are dubious about unproven value. The result is stagnation. The image presented to this research is one of asking a runner to move forward with their legs tied together.

Based on inputs to this research, it appears there is willingness in the sector to change, although more for some than for others. We also know a flexible environment is required to adopt new ways. The risk-averse nature of the industry means there is little flexibility in the systems and processes that govern and manage it. Although there are good reasons for this, ways must be found to manage risk while allowing and supporting the uptake of innovation.

The perceived dissociation between on-the-ground industry players and central government more widely, and MBIE in particular, presents a challenge. That said, participants in our research have indicated a willingness to engage with central government to work together to create solutions to current issues. The participants in our research mostly rated themselves as either open to change or keen to lead change. This is a positive message that sets a good context for fruitful engagement.

A first area to address might be to work towards simplifying the regulatory environment and a faster processing system. It is likely that considerable benefit would be gained from reducing cost, time and the expertise required to understand and interact with some highly technical parts of our building industry. If this were to be put in place, indications are industry would be more likely to engage in other activities that further improve the situation, such as more use of electronic media. The incentive might even be there for companies to invest in new systems to support the new processes.

New products and better products have been identified as enablers of change. Should a product be proven to be both safe and affordable, there is every reason to believe it will be taken up. Current barriers to uptake of new products are based around those two concerns.

Cost is, overall, probably the most important barrier to uptake of new ways of doing things. Until solutions are more affordable, it is unlikely that more than a few will take them up. The widespread adoption of new systems needs to pass the same test as any other new product – is it proven and is it affordable? The journey for a new product or system to market must be one that addresses both of these barriers.

The rate of change in the IT industry means some ‘new’ products quickly become obsolete. While updating a product or system may well mean it offers enhanced functionality, changing products too often is expensive. In addition, the time invested in learning to use it may not be productive if the learning process has to begin again within a short timeframe.

There are some barriers to adopting new ways that are fairly intractable. Human nature and the stage and shape of the industry being what it is, there are probably some fairly stout defences against new solutions, particularly IT solutions that cost money.

The big problem of attracting and retaining the right people to the industry is long term and complicated. In the current situation, there is urgency around residential new builds in particular with a secure demand for some time into the future. This is in contrast to the traditional boom and bust cycle of construction that has been the case historically.

Our research participants are clear in their understanding of their environment. Some are weary of battling just to keep their head above water in what they see as a dog-eat-dog world, where lowest prices seem to win out when they tender for work. Some

participants have pride in their craft and seek to continue to do things the way they always have because they believe in it.

The participants appear committed to finding a way forward and to doing their jobs well.

They present as caring professionals who want to do their job as best they can.

This research will not ensure the frustrations participants face will go away. What we can do, however, is highlight what we are being told, what we know from our review of the literature and what we understand to be some solutions to the most pressing issues.

We are simply passing on the messages to those who need to hear. This is the power of research.

7. Conclusions and recommendations

The research has identified what participants think are the barriers to change and what the priority areas for change are. In seeking to recommend actions to mitigate barriers, attention should be given to the following:

- What is the impact of the barrier?
- How easy it is to remove or mitigate?
- How powerful are the incentives to act?
- How rewarding will removal of the barrier be? To whom? In what way?
- Who can we work with to remove the barrier?

Using this information, we can construct a rubric to identify priority areas for action where the effect will be the greatest. We need to know where we will get maximum impact for minimum input.

Participants have been clear that they consider the biggest and most important barrier to adopting new ways of doing things in the industry as being in the regulatory framework and BCA processes. This is the obvious place to start. Is there an easy win here? Or a win at all?

Let's consider BCAs. They operate in a complex regulatory environment where, according to our research participants, some officials do not have the skillset required to do the work. Some BCAs do not even have the staff on board, let alone well trained staff able to deal with complex consenting applications. They are, at times, presented with consenting applications that are not up to standard. Participants suggest that simplification and consistency in terms of consenting processes is one of the single most important things they would like to see. Leadership in this area is important. It is likely that it would result in progress towards faster, cheaper consenting that is easier for both users and officials to work with.

The barriers to taking up new ways of doing things in the industry are not only about the regulatory system, however. They are about the risk structure that underlies it. This is a more difficult problem to solve but one that must be addressed if, according to participants, progress towards better ways of doing things can be made.

This is a long-term proposition.

Upskilling and having adequate processing and decision-making capacity is a medium-term answer. It will need investment, which may or may not be forthcoming. This is, however, one of the areas where there is not only the most urgent need for improvement but there is potential for IT solutions that will make a difference. Participants in our research would like to see this area receive urgent attention. Apprenticeships were often mentioned as being a solution in this area, as this is where upskilling can be supported.

Any progress towards improving the quality of new products entering the market is also a priority. Quality assurance is the most critical aspect. Currently, new products may be avoided if there is any concern about risk in using them.

Finally, leadership and collaboration are areas where research participants feel the real potential for change can be realised. Collaboration was mentioned by participants as being something that, from their perspective on the ground, can enable change and innovation. It can also lead to improved quality and productivity. The challenges facing

industry in relation to adopting new ways of doing things are not insignificant. Neither are the rewards. In a context of significant pressure to deliver quality construction, particularly residential new builds, the rewards are there for those who respond to the challenges.

This research has found willingness and openness among those in the industry who participated. From BCA officials to apprentice builders, there is an appetite to do better.

It has also found a high level of frustration at being unable, in their view, to do better than they are currently doing. This is due to disincentives to innovate in the context they operate in.

If adoption of new and better ways of doing things is to take place on a large scale, these barriers need to be addressed. The research participants have provided the priority areas of focus. Now someone needs to lead the change.

The building and construction industry in New Zealand faces difficult times. The imperative to build is strong. The barriers to responding to the demand are significant.

This is a complex problem. A way needs to be found, however, to enable adoption of new ways of doing things across the industry. This must and will result in improvements to quality, productivity and ease of operation. The result can only be good for New Zealand.

8. Next steps

This research is preliminary and explorative in nature. It presents a large number of themes from a wide spectrum of viewpoints. It covers technology, people, practices and processes. Ideally, it would be beneficial to comment on these themes in detail. However, due to the nature and timeframe of the work undertaken, they are presented as a whole. There is a need for more work in this area, for more focus and for clarification. These are the recommended next steps.

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Appendix A: Online survey instrument

Understanding Industry Changes

BRANZ (Building Research Association of New Zealand) is New Zealand's independent and impartial research, testing and consulting organisation. We work with the building and construction industry to provide better buildings for New Zealanders. The BRANZ Incorporated Society is a non-profitable investor in industry good research and knowledge transfer. We invest in research and information to achieve benefits for New Zealanders by improving the knowledge base of the building and construction industry.

This survey:

Researchers at BRANZ are currently exploring the human factors behind the construction and infrastructure industry's willingness or otherwise to adopt new practices. New practices and solutions to eliminating quality issues in our industry will have no impact if they are not able to be adopted by industry.

It is important that we listen to and understand your beliefs, perceptions, opinions, attitudes and behaviours toward adopting process and technological changes for eliminating critical quality issues in the industry.

All answers and entirely anonymous. Should you want more information, participation advice or to take part in interviews and focus group workshops, please contact Dr Lee Bint by email (Lee.Bint@branz.co.nz) or phone (027-405-9354).

Thank you for taking part in this important survey!

About you

1. Where are you primarily located?

- Northland
- Auckland
- Waikato
- Bay of Plenty
- Gisborne
- Hawke's Bay
- Taranaki
- Manawatu-Whanganui
- Wellington
- Tasman
- Nelson
- Marlborough
- West Coast
- Canterbury
- Otago
- Southland

2. Within which sector do you work?

- Architecture, Design, Urban Design, Planning
- Building Officials & Building Surveying
- Building & Construction Trades
- Business Consultancy
- Central Government
- Civil Infrastructure Trades
- Education
- Electricity Supply Infrastructure
- Land Surveying
- Professional Engineering
- Property & Facilities Management
- Quantity Surveying & Project Management
- Scaffolding, Rigging & Rope Access
- Science & Research
- Water & Wastewater Trades
- Other (please specify)

3. What size is the organisation you work for?

- 0 employees
- 1-5 employees
- 6-9 employees
- 10-19 employees
- 20-49 employees
- 50-99 employees
- 100+ employees

4. What is your position?

- Junior
- Intermediate
- Senior
- Executive*
- Sole Trader
- Other (please specify)

**If selected go to Q5, otherwise go to Q7*

Company size

5. What is the organisation's total annual income?

- Zero
- <$100,000
- $100,000 to $1 million
- $1 million to $5 million
- $5 million to $10 million
- $10 million to $20 million
- $20 million to $50 million
- $50 million to $100 million
- $100 million to $200 million
- >$200 million
- Not sure

6. Describe your organisation (select all that apply):

- Not-for-profit
- Government
- Non-governmental
- Local government /CCO
- Other (please specify)
- Incorporated /LLC /Partnership
- NZX listed
- Trust /Estate
- Co-Operative

Process and technological change

7. What statement do you relate to the most, in terms of process and/or technological change? (please select on per column)

	As an individual	As a company	As {Q2} sector	As an industry
Dislike change				
Only change when there's no other option				
Wait and see what happens before I decide to change				
Get involved in change at the first opportunity				
Lead change				

8. What sector do you see the greatest reactions to process and/or technological change? (please select one per column)

	ACCEPTANCE	RESISTANCE
Architecture, Design, Urban Design and Planning		
Building Officials & Building Surveying		
Building & Construction Trades		
Business Consultancy		
Central Government		
Civil Infrastructure Trades		
Education		
Electricity Supply Infrastructure		
Land Surveying		
Professional Engineering		
Property & Facilities Management		
Quantity Surveying & Project Management		
Scaffolding, Rigging & Rope Access		
Science & Research		
Water & Wastewater Trades		
Other (please specify)		

9. Thinking of recent developments in {Q2} sector, what were/are the drivers and barriers for process and/or technological changes:

Barriers:

Drivers:

10. What is your most recent experience of process and/or technological changes in {Q2} sector? (please describe what it was, how you and others reacted, was it voluntary or mandatory, other)

What worked well?

What worked less well?

Future changes

11. Who/what influences positive process and/or technological change outcomes (please explain)

12. What makes you resist process and/or technological change? (please explain)

13. Where are the biggest changes needed? (please explain)

14. Any final comments?

Appendix B: Analysis of survey findings

B.1 Demographics

Table 6. Workshop participants by location.

Location	Number	Percentage
Auckland	226	30%
Wellington	127	17%
Canterbury	123	16%
Bay of Plenty	53	7%
Waikato	50	7%
Otago	48	6%
Manawatu-Whanganui	31	4%
Hawke's Bay	21	3%
Northland	20	3%
Taranaki	11	1%
Souhland	10	1%
Not Stated	6	1%
Marlborough	5	1%
West Ocast	5	1%
Tasman	4	1%
Gisborne	1	0%
	751	**100%**

The architecture, design, urban design and planning and the building and construction trades were the most often represented occupational categories.

Table 7. Workshop participants by employment sector.

Occupation	Number	Percentage
Architecture, Design, Urban Design & Planning	233	31%
Building & Construction Trades	253	34%
Building Officials & Building Surveying	85	11%
Other (please specify)	49	7%
Professional Engineering	46	6%
Quantity Surveying & Project Management	18	2%
Education	15	2%
Property & Facilities Management	13	2%
Business Consultancy	8	1%
Science & Research	8	1%
Water & Wastewater Trades	7	1%
Central Government	6	1%
Not Stated	5	1%
Civil Infrastructure Trades	4	1%
Electricity Supply Infrastructure	1	0%
	751	100%

Table 8. Workshop participants by size of employer.

Size of Firm	Number	Percentage
0 employees	77	10%
1-5 employees	263	35%
6-9 employees	77	10%
10-19 employees	63	8%
20-49 employees	73	10%
50-99 employees	53	7%
100+ employees	139	19%
Not Stated	6	1%
	751	100%

Table 9. Workshop participants by role in company.

Role in Company	Number	Percentage
Senior	307	41%
Executive	159	21%
Sole Trader	146	19%
Intermediate	72	10%
Other (please specify)	57	8%
Junior	10	1%
	751	100%

Most participants (71%) did not report the annual income for their company. For those that did, company annual income was reported as shown in Table 10.

Table 10. Companies' annual income

Company's Annual Income	Number	Percentage
Zero	1	0%
<$100,000	40	18%
$100,000 to $1 million	64	29%
$1 million to $5 million	25	11%
$5 million to $10 million	15	7%
$10 million to $20 million	12	5%
$20 million to $50 million	12	5%
$50 million to $100 million	3	1%
>$200 million	39	18%
Not sure	8	4%
	219	100%

Table 11. Type of company.

Type of Company	Number	Percentage
Not-for-profit	3	2%
Government	3	2%
Non-governmental	22	15%
Local government / CCO	2	1%
Incorporated / LLC / Partnership	106	73%
NZX listed	2	1%
Trust / Estate	3	2%
Co-Operative	4	3%
	145	100%

B.2 Barriers to adopting new ways by profession

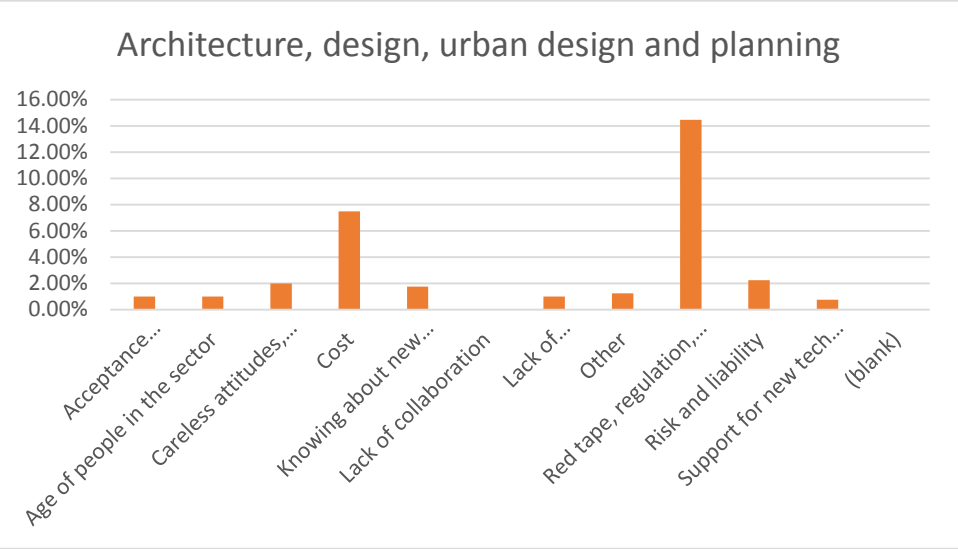

Figure 12. Biggest barriers for architecture, design, urban design and planning.

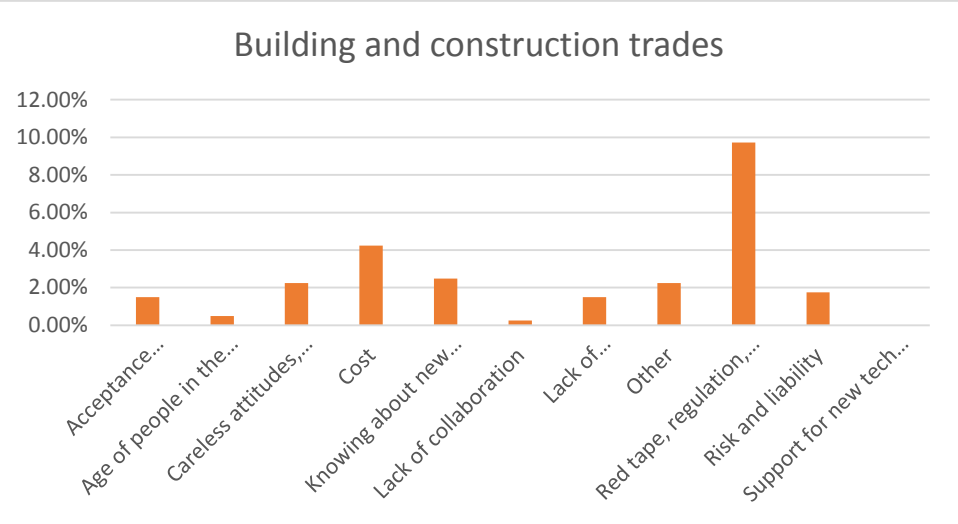

Figure 13. Biggest barriers for building and construction trades.

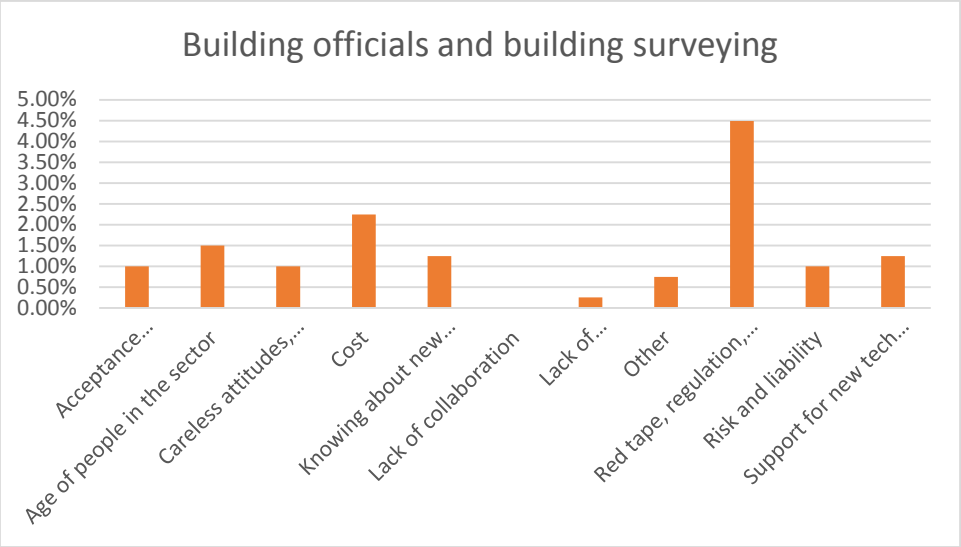

Figure 14. Biggest barriers for building officials and building surveying.

Figure 15. Biggest barriers for business consultancy.

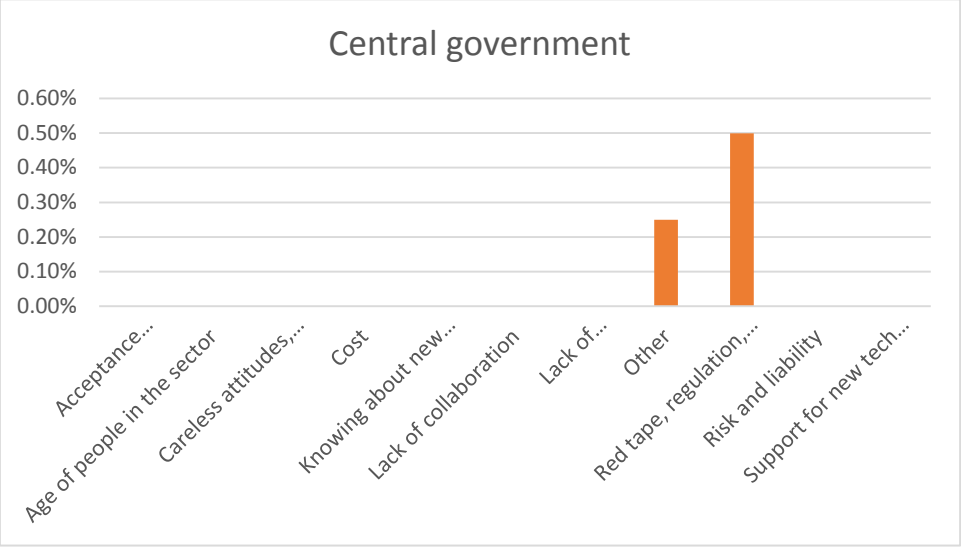

Figure 16. Biggest barriers for central government.

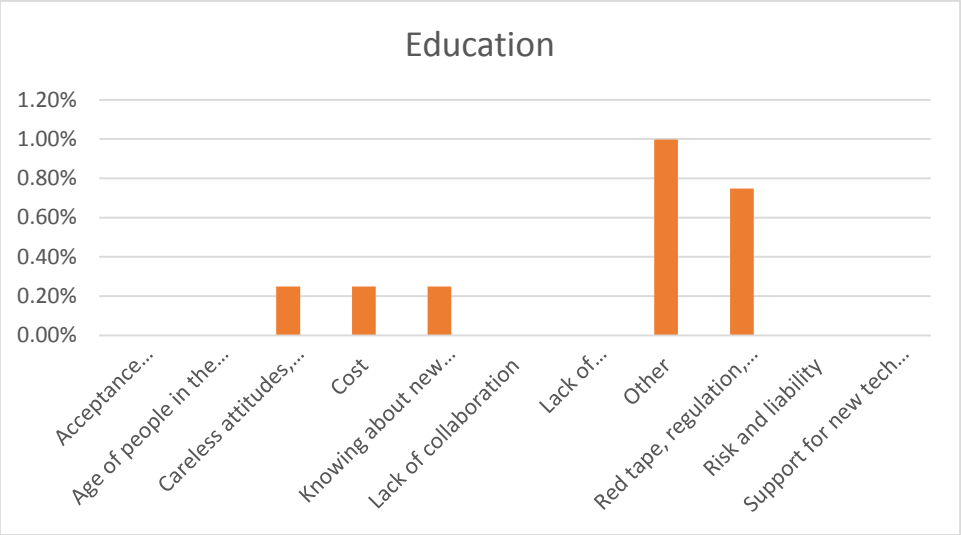

Figure 17. Biggest barriers for education.

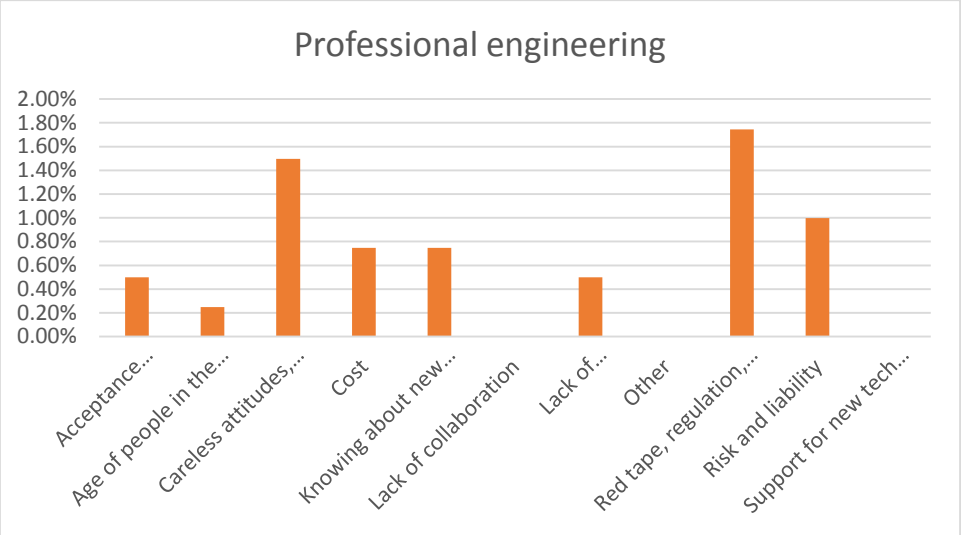

Figure 18. Biggest barriers for professional engineering.

Figure 19. Biggest barriers for property and facilities management.

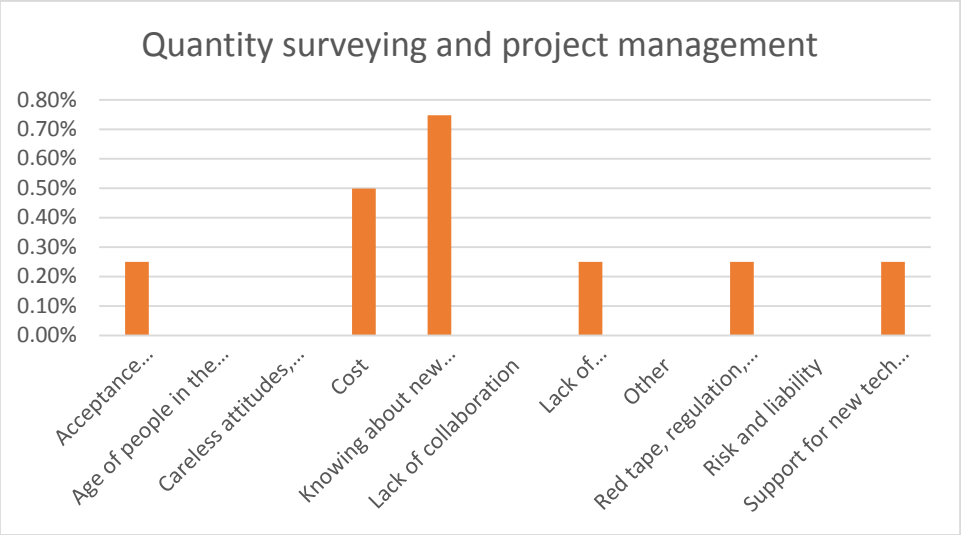

Figure 20. Biggest barriers for quantity surveying and project management.

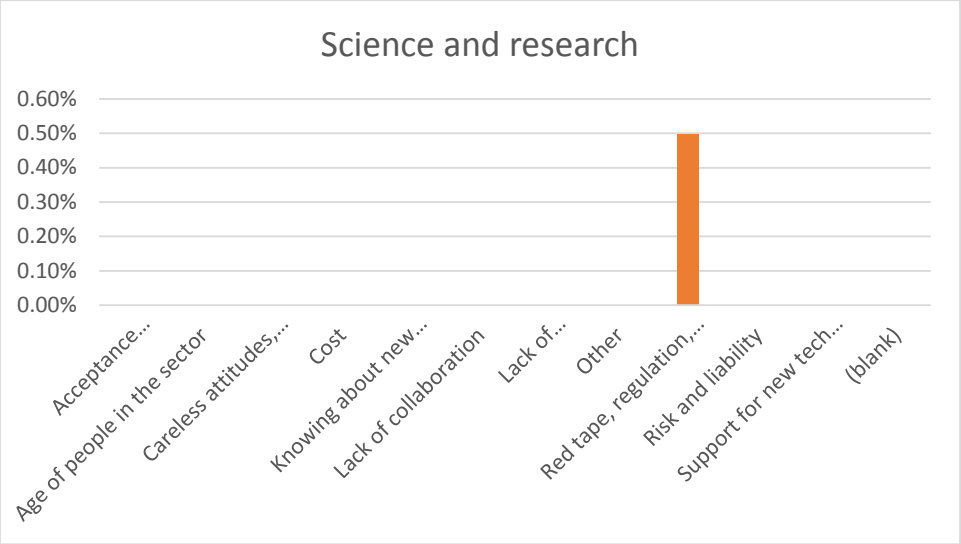

Figure 21. Biggest barriers for science and research.

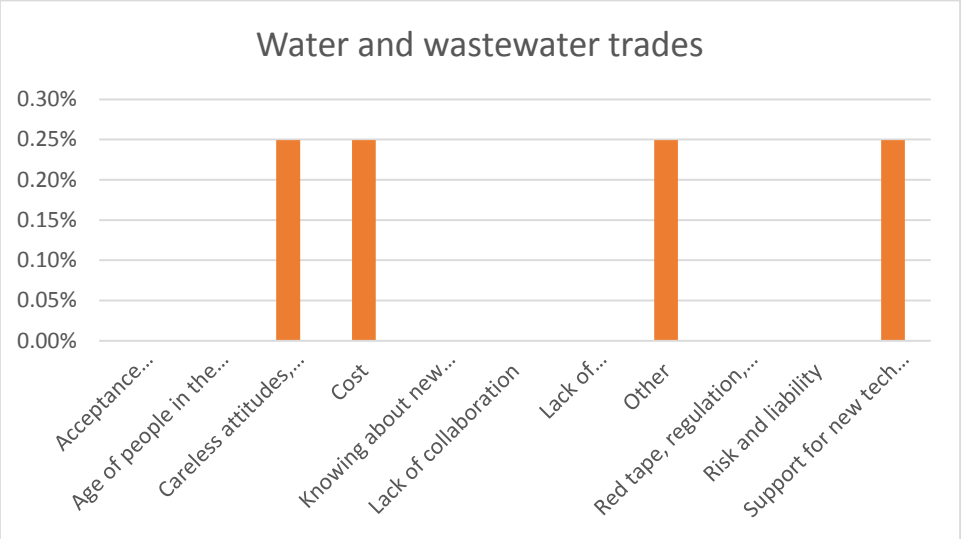

Figure 22. Biggest barriers for water and wastewater.

B.3 Aspects of change

Table 12. Influences for change.

Influences for change	Count	Percentage
A clear need to change	8	4%
A person/leader with vision	11	6%
A willingness to change/experiment/flexibility	9	5%
Less risk aversion	6	3%
A shared vision	6	3%
A commitment to quality	2	1%
Legislative/regulatory/BCA leadership	50	26%
BRANZ	23	12%
Architects/ designers	16	8%
Cost/ funding	11	6%
Education/information/ communication/ cooperation	24	12%
Industry leadership	23	12%
Research/ science	5	3%
	194	100%

Table 13. Acceptance of and resistance for change.

Sector	Acceptance	%	Resistance	%
Architecture	119	29%	28	7%
Building officials	41	10%	105	25%
Building trades	32	8%	102	24%
Consultancy	30	7%	5	1%
Government	22	5%	97	23%
Civil trades	4	1%	11	3%
Education	32	8%	11	3%
Electricity supply	1	0%	8	2%
Land surveying	5	1%	1	0%
Engineering	24	6%	8	2%
Property management	2	0%	15	4%
Quantity surveying and project management	4	1%	8	2%
Scaffolding	7	2%	5	1%
Science and research	86	21%	3	1%
Water trades	4	1%	16	4%
	413	100%	423	100%

Table 14. Reasons for resistance for change.

Reasons for Resisting Change	Count	Percentage
Costs too much to change - sometimes with little benefit	48	17%
Change is not always thought through properly/ tested	37	13%
Change can be hard to push through with government/ bureaucracy	36	13%
Information/ education	24	9%
I don't see value in the change/ is it for change's sake only?	22	8%
Some change is stupid/ impractical	20	7%
Risk	18	6%
I don't need more work/ don't have the time for new things	17	6%
How do I know it will be any better/ be of any value or benefit?	17	6%
Negative attitudes	11	4%
Wanting to stay with what you know works	11	4%
Change can be too complicated	8	3%
Overloaded with change	3	1%
Changes sometimes don't work for us	2	1%
I hate being forced to change	2	1%
Dealing with older people	1	0%
I need time to be sure	1	0%
	278	100%

Table 15. Where the biggest change is needed.

Where the Biggest Change is Needed	Count	Percentage
Changes to the regulatory system/ how government, BCAs and MBIE work	110	38%
Up-skilling in the sector/ more education/ better access to information	43	15%
New and better products/prefab/ R&D	25	9%
Changes to Building Code/ Standards	24	8%
Improved communication and information about change	18	6%
More positive attitude to innovation	18	6%
Interoperability and access to IT systems	12	4%
Collaboration	9	3%
Improved supply of cheap, quality materials	8	3%
Changes to the liability framework	6	2%
More accountability at all levels	6	2%
Making innovation affordable	3	1%
A NZ-wide electronic consenting system	2	1%
Ability to build outside the current compliance system	2	1%
A new home warranty system	1	0%
Reduce costs of innovating	1	0%
	288	100%

Appendix C: Summary of final survey comments (Q14)

These are free-text comments from the online survey, with those specific to the survey design removed and remaining comments left largely as is (with only minor grammatical corrections where required).

Change management

A company (management) that will make changes but not put in resources to make the changes work is better or not making the changes in the first place.

Change is inevitable, change happily in the right direction is not. Intelligent management of change is essential.

Change is OK, providing common sense prevails. Get the right product for the job.

Change is resisted when people do not understand the reasoning for it or when they perceive it as resulting in a direct cost to themselves.

Create consistency across the board.

Ensure efficiency to all sectors of the building and planning areas.

Get more people who have practical experience involved, which may cost more money, but believe the outcome would be good for everyone. Stop the Wellington bureaucrats from making construction laws, etc. when they have never been on a job site.

If it works and does not squeak, then leave it alone.

If it is done, it must be done well and have support training material. If it is too hard to learn, many will give up. Most have to learn in their own time, on the run whilst doing their proper job.

Improve and accept change that has been discussed and methods tested by industry and government. Ministers of departments should be professionals and with a relevant degree in construction.

Locally and nationally builders are busy. Our local consenting authority is at its limits with processing and inspecting. Locally, we are seeing more and more one-man-band builders starting up business. To have a better building industry, in my view, would be to create a model that is focused on business and best operating practice, i.e. technological change, etc. I acknowledge that I was once a one-man-band too, however that was 10 years ago. Big changes are still required, and mindset is a big hurdle to overcome with hairy arse builders.

Move fast or stay wondering.

Regarding process change if it comes from site generally it will be accepted, however with process out of government it is often difficult to see sense, detail and implementation at a practical level and, therefore, gains instant resistance. This is purely because government lacks the understanding of behaviour of those within industry, rather than wrapping process around the behaviour they try to change the behaviour through a brute force mentality.

Target specific regions, specific cities/towns, specific areas and concentrate on finishing to completion rather than having broad brush strokes with nothing coming in on budget or time.

We are in an era of unprecedented change which is challenging for individuals and organisations. Knowing which are the most significant for you is a major problem that we all face. Backing a loser is expensive and bad for morale and productivity and competitiveness.

We have been through huge changes recently without being able to catch-up. It is time to back-off and let the industry stabilise.

Communication and collaboration

Communication with developers and councils at local and national level. New market entrants required to lead change.

BRANZ and industry relationship needs to be improved. There are too many people currently at BRANZ with little or no 'coal face' experience. Set up some sort of exchange. Make it compulsory for all BRANZ technical staff to spend time in industry.

Frankly, TV shows like the 'The Block NZ' give a very poor perception of the reality of how everything must be built and the time for quality construction as per the MBIE website, Building Act and quality control, etc. Clients' expectations are not in line with how the construction industry operates. Far too much paperwork for tradespeople. On a positive note, MBIE has some very helpful information around defects etc., so, I feel it is slowly moving in the right direction

The real issue facing getting houses built, is the general negativity many Councils have. We have dealt with people whose attitude seems to be more about why something CANNOT be done as opposed to trying to facilitate things. That is a moan from 47 years in the industry.

Compliance, licensing and consenting

90/10 rule – with health and safety at 90% (or more), companies want to do what's right. Support them rather than penalise for little indiscretions, have a record where, if a company is found to have a minor breach, help them solve it, follow up and if they are still in breach after a period then penalise rather than having everyone living in fear and never actually knowing what we are supposed to be doing in many circumstances. With technology, new materials, etc., some sort of quicker risk assessment needs to be undertaken, i.e. if someone wants to trial a new idea, allow it but set it up as an in-life trial/test case and monitor. It only really becomes a big risk if an idea is rolled out across the whole country, i.e. Hardies texture coating or untreated framing etc.

A means of controlling quality – maybe with a star rating.

As it is, licensing has brought the industry to its knees and it is losing all the experienced craftsman and technical expertise. The whole thing is politically driven nonsense and I, for one, simply cannot wait to retire, it is not worth fighting it!

Bring back private processing and inspections. Most of the problems we seem to encounter are through compliance either with inconsistent building control officers,

council versus private consent processing officers, and council subdivision versus building departments having entirely different and bizarre sets of rules.

Building consenting authority personnel need to be qualified and approved by building professionals and not building consent authority peers. This is especially important for building inspectors and plan readers.

Clearer guidelines on where a permit is required, as I do not think it is helpful having the amount of grey areas we have at the moment, with owners making it difficult.

Consistency with councils would be great.

Councils are the weak link in the construction and project delivery process. We need a robust and professional private building certifier option to streamline documentation and consenting, enabling these processes to be concurrent and collaborative, not consecutive and adversarial. Documentation needs to move toward electronic platforms, away from paper based.

I am not happy with the whole of the building sector and the way things are going. Soon, I will need a licence to own a hammer.

I do not expect any real change to happen any time soon. There have been surveys, etc., before and councils say they are trying to streamline processes, but to date it is just getting harder, not easier.

I think there are positive changes as well within the industry, buy-in to the processes of council who are required to work within the Building Act and to fully engage and communicate to ensure a general lift in standards across the whole sector.

I ticked central government as those with the greatest resistance to change. The problem also lies with local government.

Liability ramifications need to be removed. Particularly for constructors and local authorities.

Repetition needs to be eliminated. Do a change to a building, and documentation needs to be supplied such as an accessibility report for the whole building any other change, e.g. an interior fit-out in one office, and a new accessibility report is required for the whole building.

The building consent authority struggles with poor or lazy design presentation. Too often, consenting issues are held up by poor quality applications that people have paid good money for poor service delivery.

The building industry has changed for the better. Licensed building practitioners should have more control over their inspections and inspectors are only there as a check and balance. Building inspectors are not designers.

The industry has to change and have less unnecessary red tape that is costing everyone involved.

The resource consent process is still a huge problem, though one of process rather than building materiality or technique. It is enormously frustrating having to guess the attitude of a consenting authority, argue one's case and spend large amounts of time and money for very minor items of consent. While I can see the virtues of full and proper reviews of major work, the conservatory issue where there is a significant delay

and fee attached to a very minor item which affects a single recession plane to a very minor degree adjoining a neighbouring windowless wall, it all seems very hard work for very little gain.

There is so much wastage in every phase of the building process – needless duplication of documentation, no consistency and lack of training in consent processing, lack of skills/supervision on site, organisations using health and safety as a money-maker by cultivating a 'fear' culture among tradies, lack of proper quality control, lack of materials optimisation, lack of recycling, too much packaging/rubbish. Appropriate technology and processes could dramatically improve this, resulting in cheaper buildings.

Too much wasted time on standard details and assorted paperwork when submitting a consent application.

When providing drinking water to the public, I believe that if you are unable to provide consistent safe drinking water, then you should not be in the business of supplying a product that is not fit for purpose. Endangering people's lives should not be acceptable in a first-world country when it comes to such a basic human right.

Cost

As a designer, I try to talk people out of building because it is so expensive – a rip-off. It is cheaper to buy plywood (made in Nelson) from Melbourne, Australia – something is wrong.

BRANZ Appraisals are too expensive and they restrict smaller players getting their products accepted by the local councils.

Cheaper sections, reduce the over-the-top prices for compliance. Particularly in the Auckland region.

Do we need in the building trade 10% retention for 12 months, plus subs retention in a trust fund for this time? This is not helping building costs.

Significant additional construction costs arise for a plethora of ill-thought through government and local body regulation.

Industry structure

A more rapid uptake of online consenting would be good for us. Consistency between authorities in process is also important as we work across a number of regions and experience a lot of variability. A more collaborative development environment would be refreshing, where authorities were more willing to participate in partnership when defining larger projects.

As an industry, we are far too fragmented, and we have far too many factions going off in their own direction with little regard for foresight to the consequences of these actions to others. This, of course, builds inefficiency.

As building surveyors, we would like the industry and the public to recognise the difference between building surveyors and building officials. Building surveyors have a very different role as it relates to providing professional advice and consultancy in the building/property sector where building officials is clearly about not providing advice but providing inspections to check compliance.

Bring back the clerk of works. MBIE needs to be more open and helpful. If they write the documents, then they should be the best to provide guidance on the application of them. Sadly, they hide behind the computer and refuse to provide any advice in case it comes back on them or could be construed against them. They need to stand up and rule from the front rather than try and hide on the sidelines. Also, councils need to get off their high horse and when someone raises something with them rather than ignore them because they are “having a go at Council” they need to realise we are all in this together. I see far too many council mistakes still happening, which I believe is down to lack of training, etc. There needs to be a forum where we can air Council and other professional tradies errors/problems and learn from them and know that they will be taken on board. It is frustrating when council miss things on drawings and documentation on one project but go over the top in relation to similar aspects, on other projects. This happens on site as well.

Historical beliefs and habits within the trade need to be broken to move forward.

How about making the homeowner take more responsibility for looking after their homes?

I feel sorry for the people in Auckland who are still having leaky home issues. I remember looking for boric treated timber and was very disappointed when it was discontinued in the 80s. Big businesses drove the change to monolithic construction methods, which were approved by BRANZ, yet none of them have been held accountable. And yet, the rule book has been stiffened up because the builders were at fault. Yeah right. This whole exercise is just to cover big businesses arses. I hope the Education Department wins their exterior cladding court case.

I hope that there will be change, to enable the industry to have good quality buildings and to stop the mess which is going on in the industry at the moment.

If a system is working well, there will always be changes, not because it was not correct but because the systems allow for improvements to be made.

If you look at the industry as a whole, it is now overburdened with rules and practices not necessary.

In a risk-averse, litigious environment it is not always easy to affect positive change. Our industry has become overburdened by middlemen. Deregulation has opened the industry to any number of “fly-by-nighters”.

Lack of good management, including resourcing are the biggest barrier to changes. Workers, on the most part, want to do the best job they can but are not given the tools or time by management.

Lack of initiative and responsibility.

Maybe we need to look for inspiration and direction in other industries. Construction seems so weighed down with legacy from previous times where as other local industries such as boat building, farming, film making do not seem to carry that baggage and hence appear to be world leaders rather than reluctant followers.

Suppliers should definitely be a key part of the solution – they have in-depth knowledge of what should be the built result (or should not, and if not, they need to upskill or employ capable staff).

The aviation industry is very slow to change, but it does incorporate change when methods or components are appropriately verified. Aviation industry record keeping is also a good example of how things should be done and the way the building industry has moved this way is good.

The industry that I have worked in and loved for over 40 years, over the last 25 years has slowly, no rapidly, turned to total rubbish. How can a carpenter or builder have the same pride that they had 40 and 50 years ago?

The New Zealand building construction groups are because a lack of scale and revenue, do not set aside time to take on board new concepts and innovations.

The New Zealand housing shortage is creating a goldmine for companies inflating product costs. Look at what happened to the cost of Pink Batts when insulation became compulsory. There are no regulators out there keeping this stuff under control.

We live in dynamic times with ever increasing pressure to do things faster and more cost effectively. What we should never lose sight of is quality. The Building Act states a house life is indefinite, but not less than 50 years – we should always focus on the indefinite, not the 50.

We need leaders to move forward.

We need to aim to build better with new typologies, to meet both current and forecast demand for medium-high density accommodations – more efficiently. Both private and government, construction industry and regulatory need better platforms for progressing newer technologies and innovations; planning restrictions and building controls apply rules to limit the idiots or greedy/lazy, but could put more resources into spearheading how private ventures could harness opportunities for smarter building.

We need change, we are 20–30 years behind the rest of the world.

We need to improve the quality of our goods and services and not rely on imports which in most cases result in a less robust product. We need to invest more in test and research to help achieve this.

We need to justify changes to clients. Especially where time delays or costs are involved.

Innovation and alternative methods

Assessment of alternative solutions remains an issue, especially with increase in manufactured building solutions and imported panelised systems. There should be emphasis on insulation, energy efficiency, green design, substantial subsidies for solar panels for hot water and photovoltaic, and roof water collection/reuse systems should be mandatory.

Better access to alternative construction methods, supported by BRANZ and backed by financial implications if adapted.

Building industry lacks life cycle analysis and environment product declarations to compare the best methods and systems. We rely on outdated, and sometimes skewed, data to make decisions.

Keep up the progressive forward-thinking, because it needs to be driven further and harder to avoid more systemic defective construction practices that New Zealand is now known for.

Need to encourage people to be more creative. Also need a New Zealand Innovation Hub to drive this.

Prefabrication is the future. Prefabrication of parts and systems, rather than entire buildings.

The complete construction industry needs to change, and it starts with using better construction methods, more suitable for the climate conditions.

The continued procrastination engaging with sustainable building practice across all sectors.

The difficulty and cost to an individual to provide new building alternatives makes drastic change using the most modern technology very slow to implement.

The industry working at a tier 2 and 3 contractor level appears to be slow to adopt new technologies or processes, beyond the latest mobile phone or application. This seems to be an investment or return scenario. Architects and designers at this level are dependent on contractors having confidence in new processes or technologies and undertaking them efficiently before having confidence in specifying or employing them themselves. Territorial authorities or building consent authorities just are not sure of themselves and do not seem to be able to embrace new ideas or technologies without panicking and ducking for cover, wanting everybody else to accept full and final legal liability.

There is good and bad innovation. Need drivers for good.

Regulations and standards

Anything unknown, check the BRANZ test. We have good quality standards, cost should not come into it. Look overseas, how many buildings fail?

Change the minimum standards.

End user needs to be involved in influencing standards.

Forgot about one barrier to innovation – building controls, e.g. New Zealand Building Code. It does not encourage innovation in design at all, from a building services aspect anyway.

Free access to New Zealand standards.

Government reluctance to change, except where this benefits their agenda (i.e. land swap for conservation land) is destroying the credibility of our industry and ultimately the quality of our environment. Who legislates the legislators?

Government should lead in directly designing and building ‘socialised’ housing, with good urban planning.

I am knocking 70 and have been in building in one form or another since an 18-year-old. Yes, I have seen many changes and have grasped a number of them, as a young labour contractor in Hamilton I was one of the first tradies to acquire a nail gun –

rattler. Changes in materials followed easily. Just recently, I installed into a project thermally broken window sashes, these should be mandatory. I witnessed the beginning of the leaky home syndrome, a cladding system that James Hardie changed the specifications on to compete against rival systems. When monoclad was first brought to the industry, it was a requirement to back all joints and corners with in-seal tape, but cost ruled, and the rest is history. Now we have an industry run by bureaucracy. But, good came out of it with licensed building practitioners. I have been a member of Master Builders and are currently with Certified Builders. I have trained four apprentices and attempted with many others.

It was a sad day when Standards New Zealand was starved of funds, and an even sadder day they were absorbed by MBIE. The increase in pedantic regulations has increased the drawings hugely for buildings without any increase in quality. Less people pushing paper around and more people checking what is happening on site would increase quality much more than constantly bombarding people with change.

New Zealand standards ought to be free of charge. There ought to be a library of historical reference of technical information, not just current (building surveyors need this).

New Zealand standards that relate to the construction industry should be free to the industry, like the New Zealand Building Code.

Nothing will change until, as a country, we accept how far behind we are, building more project homes to the minimum standard will never fix the problems we are facing.

One big step forward would be new E2 acceptable solutions added around recessed doors and windows that sit back in the framing line not over the cavity.

The New Zealand Building Code and NZS 3604:2011 are well out of date with modern technology.

Technology

BIM is a powerful tool for change.

Do not use technology to complicate building.

Having good search engines on websites to find the latest legislative requirements is a key to people doing the right thing and not getting hammered for getting it wrong.

Generally, I get the feeling that industry is willing to embrace new technology that makes sense, what we often find is the willingness, the ability and technology to do the job. However, New Zealand infrastructure to deliver connectivity to make this all come together is not wide enough, consistent and reliable. This then close doors for industry to be proactive with technology change.

Training, education and career pathways

A poorly understood facet of being a ‘tradesman’ is the enjoyment of being able to fashion an object to match a design on paper, out of raw materials. These people do NOT want to work in a factory that spits out 5,000 houses per year. Nobody wants to live in a house the same as their neighbours’. This is why cars are made in factories by machines and houses are built on site by people. There is a great deal of work done in

New Zealand on the details of buildings, such as waterproofing, etc., and bugger all on the process (the pathway, timing, scheduling) of building a house from the ground, up. I have instructional videos (1991) of two guys in their 60s who could frame a 150 m^2 house from finished foundation to closed in a week. Wooden floor, no pre-nail frames, no trusses, hammers and portable circular saws. When I first saw it, I couldn't believe that this basic knowledge hadn't been available to me for over 20 years. They had taken the whole process to a series of simple steps, which followed one after another. If the New Zealand carpenter generally had this training, there would be far fewer pre-nail factories here.

As an industry, we are slow to adopt new technology, resistant to change, stuck in old ways and consistently have old-school thinkers driving the industry. Where is the diversity in the work groups, standards boards and contributors to the industry? Where are the younger, more innovative voices represented?

Better education and training is required right across the sector. Improved signalling by govt sector of upcoming projects would help forward planning and encourage more investment.

Encourage those who have proved they are competent in their industry to stay in it. Stop trying to drive us out.

Everyone is covering their arse so much, that it is very expensive to produce a decent set of plans – maybe get rid of do-it-yourself shows, like 'The Block NZ' and do a show on the design process/compliance/actual on-site building techniques and expert advice. This will better educate the general public what is actually involved when constructing a building and the real timeframes that should be expected.

Had three apprentices, and they are leaving the industry with a good feeling for the future.

How's education going? From Australia, you should put that in your location question number one.

I am building my own house at present, and appalled at the lack of productivity caused by re-work because individuals have not looked at specifications/drawings or measured correctly or are just inept at their work.

It has been dispiriting watching MBIE and local governments resort to management of building controls by people who do not know the business. Building controls desperately need new people entering the workforce, but whilst central and local government continue to "short change" building control staff in the variety of ways they are currently doing, there is little to no incentive for young people to join our ranks.

Our educational establishments need to start imparting to students the value of getting a proper trade skill, rather than treating the trades as the place you go if you are not sufficiently academic to go to university. The rot starts there.

The building apprenticeship system is still not producing competent tradespeople in many cases. It is an expectation now by the trainee that when the paperwork side of things is completed or merely ticked off, then he or she is ready and should be qualified and recognised as a tradie. There should also be a minimum number of hours of related work attached to the qualification.

The construction sector should have a set contribution of turnover to training. Currently we rely on businesses who train, who then lose that investment to those who do not train who offer higher rates. Everyone should be contributing to training.

The continuing professional development system associated with licensed building practitioners is ridiculous, by forcing people to attend hours of lectures which, in a lot of instances, produce little real material benefit. All hours need to be charged out. All our hourly rates should have increased to cover all the additional documentation.

The industry is not one industry but many individuals. There is a big gap between sole traders in all fields and the large companies. At this rate, it is unlikely that sole traders will remain in this industry – the risks are too great and the increasing hours to meet compliance is disproportionate to what clients will pay for. Result – change of careers very likely – especially at mid-levels where there are already too few experienced people. Bring back the Ministry of Works – a training ground with common shared knowledge, mentoring and standard practice. Where are the training grounds today? And, where are you going to find seniors – they are not there! My builders are at retirement age. There is a big skill gap between young and seniors, primarily there are no 'in-betweens' and now very few senior mentors. The government for over two decades has shown no concern over this. Where are the figures about the industry – its age, numbers, and how the transfer of knowledge is done. And yes, I am brassed-off – and only 15 years to a possible retirement career change is likely.

The introduction of 90-day trials is a god-send. Would be good to increase to 6 months as people's flaws can be kept in check for 3 months. I believe this would give employers even more confidence to risk employing more staff. On the flip side – harsher penalties for companies that abuse their staff. I believe the percentage of bad employers is very low.

There appears to be not enough education in the private sector. Plans coming into the council for consent processing – the quality is appalling – who is teaching these people to draft?

There is no obvious industry training or career pathway into building official roles. It is something you stumble across, and would not seek out as a profession. This is an obstacle to recruitment and retention of expert staff.

Today's constructors have not come as far from the cathedral builders of the middle ages as today's automakers have from the cartwrights.

Training is so important. Skill levels have to be raised throughout the industry.

Unfortunately, BRANZ are seen as being very inconsistent and this inconsistency becomes an impediment to product development. Sometimes, they appear obsessed with detail and others they seem to provide carefully worded appraisals to products which require a level of skill from the industry that does not universally exist.

We have seen big changes in the building industry around establishing or avoiding liability. I have seen good education around health and safety and energy efficiency but none around how the additional documentation and bureaucracy will actually improve buildings.

We poorly train our construction workers from the beginning, middle and end! Technological changes in the pipeline are going to tip construction, as we know it, on its head and the people in the trades will not be able to handle what is coming. What is

ahead in changes will be greater than what was seen in the industrial revolution era. We are not prepared in any for it due to the roadblocks at a central government level (the housing crisis we are in is the classic example of no long-term planning).

Whole industry needs to up its game, less layers of bureaucracy and more recognition of qualified tradespeople skills.

Yes, there is a lot to do to educate the market to deliver something other than the status quo and deliver better performing buildings in both the residential and commercial sectors.

Appendix D: Comments from workshop feedback forms

4, 5: I didn't express many views, rather listened and learned. Points discussed were very interesting

50% people showed up, maybe pay when you sign up and get the money back when you showed up.

Action to lobby Government on issues discussed

Discussion must be kept going. Our environment is at risk. Climate change is rushing on

Enjoyed it. I hope there is some wider ?? as a result of this workshop

Enjoyed the small group size for ease of communication, great facilitation – excellent follow up questions

Enlightening to have variety of views on the building industry

Format restrictive – only looked at surface issues, not fundamental underlying cause. Thank you for the vegan food.

Good Discussions

Good diverse range of people. Would have been good to have greater numbers attending

Good Fun

Good Initiative

Good to get feedback and have discussion with people in different roles in the building industry, get a different point of view etc.

Good way to exchange viewpoints

Great opportunity to meet people of our industry and express views.

Great to have this discussion with representatives from various industry actors. Clearly we need to continue forums of this nature to push for change moving forward.

Hope the information will be used & followed up

Hopefully this research will benefit the industry and help make the necessary changes identified

Huge industry issues which need addressing across all areas: compliance, training, responsibility, documentation.

I believe it would be valuable to keep these workshops going – with other participants (up to 5). Then bring everyone back together to drive the main points – get to the next step/stage

I have interpreted ANW as thought leadership. Disruptive session. It was the same old issues revisited.

I hope BRANZ follows up on the ideas we presented

I hope that our time/input has some positive influence on the change required

I support this type of workshop to generate discussion to benefit the wider construction industry knowledge and process

If the industry was to adopt new ways it will result in some positive outcomes. However, it won't get to the root of the issue. We need to draw a line and start with a new generation and empower them to make change and supersede old ways of thinking

If we allow the politicians to make changes they are only interested in getting re-elected and will not make the changes that are needed

Important that outcome from seminar are distributed. The participants and decision/policy makers with Central Government and MBIE

Instead of a do-it-yourself workshop, BRANZ bring case studies or information about the construction industry to light. In my mind I was expecting a construction learning experience about new ways to build or new ideas that can create a better future.

It is great that the building industry is taking a look at itself and wanting to make some changes.

It is hoped that some of the points raised in the meeting will be implemented.

It was cool to spend a quality time with experienced people from different parts of the industry. Quite Interesting it was to learn new things.

It would be good to get feedback on how consultation goes with MBIE. Good venue & information is relevant.

It would be good to receive feedback on how this workshop is being utilised/where is it all going?

It would have been more constructive discussion if we had been told that we are the contributors, so we could have been more prepared.

More communication is needed between all people within Building Industry. Everybody was very engaged and willing to participate

Needed more focus, felt like a free for all

Needed to be promoted as a discussion group. Would be the first time I feel my practical views have been heard.

Not quite what I'd expected (I thought it was more project focussed), but still interesting just the same.

Should have been full day

Single session was good rather than full day

Small group great for discussion, but a few more to get even more points of view would have been great

Smaller groups made conversation easier

Smaller groups worked very well to both hear and be heard

Thank you for including me in your research

The agenda was not clear before the workshop commenced

The external report will be more useful than the actual participation

The findings of the workshop should not be put on the shelf. They should go to the minister

The workshop was a good start. A bit more needs to be done in this area.

There was time to go into more detail but speed early & lots more could have been covered

This felt like covert consultation – the workshop promotions in no way flagged this as a feedback forum.

Tighter Guidelines on Discussion

Too oriented towards housing

Valid discussion topic

Very good, good group

Very useful – especially with the different areas of the trades people.

Very well run, stimulating discussion that needs to be done on a regular basis to gain feedback on the industries issues

Watch this space

We contributed our time and expertise, will we be informed of any results or info?

Well worth coming to

Where we list and rank – can be very useful tool

Would be great to see some of the recommendations implemented

Would have been good to have a larger diverse group, to spark a bit more discussion & debate or diverse views. It wasn't quite what I was expecting with regard to the workshop/general discussion format, but was pleasantly surprised how interesting and interactive it was. Thank you.