Efficacy of adaptive reuse for the redevelopment of underutilised historical buildings
Towards the regeneration of New Zealand’s provincial town centres

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Abstract
Purpose – Most provincial town centres in New Zealand typically feature old and vacant historical buildings, the majority of which possess heritage values. The growing perception that it is cheaper to repurpose vacant historical buildings rather than demolishing and rebuilding them is one of the factors that have made the adaptive reuse approach so popular. However, will this also be the case for provincial town centres in New Zealand? The purpose of this paper is to identify and explore the key factors that could influence the efficacy of adaptive reuse, and check for significant differences in the effect that each perceived factor would have on the adaptive reuse efficacy as a justifiable resilient and sustainable approach towards the regeneration of a major provincial town centre in New Zealand that is currently experiencing inner-city shrinkage.

Design/methodology/approach – A focus group workshop was conducted with 22 stakeholders involved in an existing town centre regeneration agenda for Whanganui. Closed-ended questionnaires were administered to the workshop participants to measure their opinions regarding the efficacy of the adaptive reuse approach for the regeneration of Whanganui’s town centre. The participant mix comprised a combination of structural engineers, quantity surveyors, architects, estate valuers, building owners/developers, legal representatives, heritage representatives and local government council representatives.

Findings – The study reported a high proportion of respondents that strongly agreed to the positive impacts of adaptive reuse with regards to the discussed priority aspects, hence, justifying the efficacy of the approach, towards delivering a vibrant town centre for Whanganui. Also, the Friedman’s analysis suggests that no significant differences existed among all perceived adaptive reuse efficacy criteria by the workshop participants, therefore justifying the approach.

Originality/value – This paper’s originality pertains to the practicality of changing the use of vacant historical buildings in Whanganui, which is one of New Zealand’s major provincial town centres, to renegotiate resilience and sustainable urban regeneration for the area.

Keywords Resilience, Historical buildings, Adaptive reuse, Efficacy, Provincial, Town centre regeneration

Paper type Research paper

Introduction
Old historic buildings typically possess features capable of contributing to society’s culture and preservation of its architectural history in an extensive manner (Langston et al., 2007). A significant number of these historical buildings play a crucial role in the socio-economic and cultural development of society (CPWD, 2013) by providing a physical link and
progression of cultural evidence to the past (Goodwin et al., 2009). Also, inner-city historical buildings are usually considered assets for the development of local tourism, due to the heritage and socio-cultural values they possess (Bedate et al., 2004; Pedersen, 2002; Ahmad, 2006). However, empirical evidence has identified factors such as urban shrinkage (Martinez-Fernandez et al., 2012), obsolescence (Langston, 2011) and self-congruity perspectives (Sirgy et al., 2005), to be responsible for the underutilisation of historical buildings. It is therefore essential to preserve and maintain these buildings due to the core heritage and cultural values they present.

In New Zealand, most provincial town centres typically feature old and vacant historical buildings, the majority of which possess heritage values. Findings from a recent study identified building conditions, socio-economic factors and building regulations, as causal factors to the high vacancy rate of historical buildings in New Zealand’s provincial town centres (Esther Yakubu et al., 2017). The conservation and reuse of these disused buildings could go a long way in contributing to the growing need for regenerating the inner-cities of these provincial town centres. The adaptive reuse trend has been noticeably recognised from previous studies as a practical approach in improving resilience and sustainability of obsolete historical buildings (Bullen and Love, 2011a; Bullen and Love, 2010; Bullen, 2007; Langston and Shen, 2007; Wilkinson et al., 2009; Gallant and Blickle, 2005; Ball, 2002; Douglas, 2006; Latham, 2016; Pearce et al., 2004). This reuse inclination emphasises the need to retain the original identity, character, structure and real significance of older historical buildings through the adaptive reuse process (ICOMOS Australia, 2013).

Furthermore, the growing perception that it is cheaper to convert older buildings for newer functions rather than demolishing and rebuilding them is one of the significant factors that have contributed to the vast interest in the adaptive reuse approach (Ball, 2002; Pearce et al., 2004). In a quest to minimise the social and economic costs of redeveloping an urban area to be more resilient and sustainable, adaptive reuse approach is beneficial to governments, communities, building owners and developers (Wilkinson et al., 2009; Bullen and Love, 2011a). Although some cities have started to realise that an essential aspect of any successful urban regeneration plan is the reuse of historical buildings for new functions, the objectives of adapting historical buildings appear to overlap with several desired outcomes of resilience and sustainability (Ball, 1999). Hence, there is a need to consider the efficacy of using the adaptive reuse approach as an effective strategy for urban regeneration plans (Bullen and Love, 2009).

In the above context, the study discussed in this paper focuses on identifying and exploring the key factors that could influence the efficacy of adaptive reuse, and also, checking for significant differences in the effect that each perceived factor would have on the adaptive reuse efficacy as a justifiable resilient and sustainable town centre regeneration (TCR) approach. A focus group workshop was conducted with relevant stakeholders involved in an existing TCR agenda for Whanganui, a major provincial area in New Zealand. Findings from this study offer potential strategic insights on how vacant historical buildings that are adapted for new uses could the resilient and sustainable growth of provincial town centres in New Zealand and other areas of the world.

Overview of the current situation

Whanganui is a typical provincial town located on the west coast of the North Island in New Zealand and has a town centre famous for its collection of built heritage precincts (Esther Yakubu et al., 2017). These heritage buildings possess some original architectural character that dates as far back as pre-1935. In the past, Whanganui had about 10 per cent of the total number of heritage buildings in New Zealand. Accordingly, due to their popularity with visitors, these buildings were worth about NZD40m a year to the economy of the local area (Statistics New Zealand, 2017).
With a territorial area of about 2,400 km² inhabited by about 43,000 people, Whanganui has a population density of approximately 18 people per km², and has experienced population decline at a rate of 1.1 per cent (i.e. by 486 people) since the 2006 census (Statistics New Zealand, 2017). Statistics from the 2013 census presents the total number of vacant buildings in Whanganui to be 1,839, as compared to 1,449 buildings from the 2006 census (Statistics New Zealand, 2017). This trend depicts an increase in vacant buildings in the region with a vacancy rate of 21.2 per cent. According to Esther Yakubu et al. (2017), socio-economic factors, poor building conditions and building regulations were identified as dominant contributing factors to the steady decline of Whanganui’s town centre.

The local review of Whanganui district council’s 2010 district plan led to the introduction of Whanganui’s existing TCR strategy, with the overall vision of making Whanganui’s town centre visible (Whanganui District Council, 2016). The strategy focuses on providing a general comprehensive plan that will balance conflicting stakeholder objectives and interests, to achieve best resilient and sustainable outcomes for the area (Whanganui District Council, 2016).

Research objectives

(1) To identify and explore the key factors that could influence the efficacy of adaptive reuse in regenerating Whanganui’s town centre; and

(2) to check for significant differences in the effect that each perceived factor would have on adaptive reuse efficacy, towards a justifiable resilient and sustainable town centre regeneration.

Literature review

In this section, a review of the contextually relevant literature to the indicators of urban regeneration, and the concepts of resilience and adaptive reuse is covered.

The rationale for regenerating provincial town centres

Historical buildings in typical provincial town centres usually experience high vacancy rate due to some contributing factors such as poor building conditions, socio-economic factors and building regulations (Esther Yakubu et al., 2017), hence, causing these buildings to be irrelevant to the original purpose for which they were built. The resultant effect of these identified factors on typical provincial town centres is “urban shrinkage” (Martinez-Fernandez et al., 2012; Rink et al., 2010; Wiechmann and Pallagst, 2012; Esther Yakubu et al., 2017). Some socio-economic factors have been reported to contribute to a high vacancy rate of historical buildings in provincial town centres (Esther Yakubu et al., 2017). The social factors were identified as: population decline, mass emigration from inner-city, reduced disability and car park access, and competition from modern construction, while low property values, depressed property market and high lease cost were identified as the causal economic factors (Esther Yakubu et al., 2017).

Furthermore, an issue widely ignored by researchers is that when considering sustainable activities, there is a wide margin in the relationship between low occupancy levels of historical buildings in provincial town centres, when compared to bigger cities, which usually experience housing shortage (Buttimer and Ott, 2007). Within the limits of sustainability agenda, there is substantial debate necessitating the improvement of the historical building stock in all areas including provincial town centres (Brundtland Commission, 1987). This debate is driven by the potential financial and socio-cultural resources that would most likely be gained by the affected communities (Kohler and Hassler, 2002). In recognising the significance of vacant historical buildings, little consideration is given to the buildings in provincial town centres in New Zealand (Esther Yakubu et al., 2017). Acknowledging this fact
will, therefore, promote both cultural and socio-economic vitality for these areas through encouraging the efficient reuse of heritage resources (Myers and Wyatt, 2004). Also, the reliance on market-centred policy and community self-help solutions that most government proffer have not been so far justifiable in bringing the town centre of these smaller cities back to life (Alston, 2004).

Adaptive reuse in the context of community resilience

Resilience describes the manner in which various systems can “bounce back” after experiencing disturbances, and this has been established in the fields of ecology, physical sciences and engineering (Bodin and Wiman, 2004; Walker et al., 2004; Woods et al., 2012). Several meanings have been attributed to the term “resilience”, and have been applied to diverse contexts, ranging from social, economic, community, psychological, ecological and physical resilience, to disaster resilience (Gallopín, 2006; Klein et al., 2003; Manyena, 2006; Norris et al., 2008; Zhou et al., 2010; Smith et al., 2016). Although resilience has become more popular over the years and has been defined in several ways (Pendall et al., 2010), its numerous definitions are still argued to be vague and fuzzy (Markusen, 2003; Bhamra et al., 2011). The concept of resilience was initially introduced within environmentally friendly systems, and later on adopted by sociology or economic systems, which usually require the consideration of some socio-economic entities such as cities, regions or countries in spatial settings (Dolega and Celińska-Janowicz, 2015).

Community resilience is the ability of a community to tackle a disturbance by anticipating for it, preparing for it responding to it and recovering from it (Foster, 2007a, b). From an economic point of view, Hill et al. (2008) define community resilience as the ability of a community to successfully recover from an economic shock that has thrown the area off its growth pathway or has the potential to do so. Likewise, a more general description of economic resilience suggests the degree to which local authorities can ride global economic blows, work within the limits of their urban area and have high social inclusion levels by quickly bouncing back to normal state after a disturbance (Ashby et al., 2009). Still on the focus of community resilience, the introduction of the adaptive reuse approach as a viable tool to regenerate provincial urban areas posed with declining socio-economic and environmental well-being of its residents could go a long way in promoting resilience for the sustainable development of the areas.

The rationale behind the concept of community resilience through adaptive reuse presents a potential for changing its focus in existing urban regeneration plans by improving some rigid conservative interventions and analysis. To begin with, resilience thinking considers the alteration of a system as normal, with the inclusion of dynamism as an intrinsic fragment of the manner in which systems operate. The resilience thinking also emphasises the essence of assuming alteration and elucidating stability, contrary to assuming stability and elucidating alteration (Folke et al., 2003). Furthermore, the resilience concept has been included in this paper to justify the importance of radical adaptive reuse strategies that will generate better opportunities for urban regeneration, through an increase in community-led social, economic and environmental initiatives (Brown, 2011). However, suggestions from some post-recession urban regeneration analysis conducted in Hong Kong and London infer that resilience could be better seen as a dynamic process whereby alteration and constant reinvention of a system justify its socio-economic and environmental strength, rather than just “bouncing back” (Raco and Street, 2012).

What is adaptive reuse?

Old vacant historical buildings that are fast approaching possible demolition could be considered as “raw material mines” for new building projects (Langston, 2008). Simply leaving the fabric and basic structure of these historical buildings intact and changing their use has
been argued to be a more sustainable approach, when compared to assigning building materials from demolition to new building applications (Ball, 1999; Douglas, 2006; Langston, 2008; Bullen and Love, 2009; Wilkinson et al., 2009). This technique is labelled “adaptive reuse”. Adaptive reuse, also referred to as “adaptation” in some literature, implies: the change of use of an existing building (Douglas, 2006); the retention of the original fabric and structure of the building (Bullen and Love, 2009); or the extension of the useful life of the building (Mansfield, 2002). The adaptive reuse process involves the conservation of functionally obsolete or old disused historical buildings for new and more appropriate functions (Shehata et al., 2015; Ijla and Broström, 2015). Moreover, the adaptive reuse approach focuses on repurposing an existing building to enable it to function as a contemporary building while preserving its useful features (Douglas, 2006; Wilkinson et al., 2009). Adaptive reuse could occur either “within use” or “across use” (Wilkinson et al., 2009). For instance, the “within use” concept would entail an existing commercial building being reused for other commercial purposes, while the “across use” concept would involve changing the use of the commercial building for residential purposes (Ellison and Sayce, 2007).

The adaptive reuse approach which has been successfully used to redevelop different kinds of existing buildings, from government buildings, defence estates, airfields, to historical buildings, is also considered a strong base for most sustainable development plans and government policies in most parts of the world (Langston and Shen, 2007). Looking beyond conservation and satisfying the desires of new users, adaptive reuse could contribute to improving the economic, socio-cultural and environmental conditions of provincial areas that desire regeneration (Bullen and Love, 2010; Bullen and Love, 2011b). With the aim of increasing the number of reused historical buildings in provincial towns, the adaptive reuse approach has also been argued to be a more sustainable alternative for promoting and incentivising seismic resilience and urban revitalisation efforts in active seismic areas (Ijla and Broström, 2015) such as New Zealand. Likewise, to support the sustainability agenda of provincial urban areas, having a significant proportion of old vacant historical buildings, a broader urban regeneration strategy could be that these buildings be reused as a substitute to demolition and rebuild (Ball, 1999; Wilkinson et al., 2009; Bullen and Love, 2011b). Hence, the benefits of adaptive reuse have been identified to improve the economic, social and environmental performance of existing buildings (Bullen, 2007), including heritage buildings (Bullen and Love, 2011b; Yung and Chan, 2011). However, building owners and property developers may still show reluctance in embracing this strategy due to: some perceived problems relating to increased maintenance, seismic safety, health and safety, building design inefficiencies, decreased rental returns, zoning, uncertainty and commercial risk (Bullen and Love, 2010).

Furthermore, in modern conservation theory, adaptive reuse could be considered an essential approach towards actualising viable urban regeneration strategies. Some existing theories on the adaptive reuse approach have been compared and classified based on its efficacy for urban regeneration, and also from the perspectives of architecture and heritage preservation. Accordingly, a typological theoretical approach to the efficacy of adaptive reuse involves the historical analysis of adapted case study buildings, organised based on the building type (Latham, 2016) and host space typology (Douglas, 2006). The focus of the typological approach is on the cause of the building deterioration, the barriers and critical success factors towards reusing each building typology (Plevoets and Van Cleempoel, 2011). Unlike the typological approach, a technical theoretical approach focuses on the technical improvements of the load-bearing structure, the building envelope, and the comfort, safety and energy efficiency of the adapted buildings (Douglas, 2006; Highfield and Gorse, 2009). Moreover, a strategic theoretical approach of adaptive reuse emphasises an analysis of the different strategies and processes to be adopted for the conversion of existing historical buildings through, suggested possible methods of justifying the alteration of an existing
Additional approaches to adaptive reuse plan of action that would synergise the typological, technical and strategic approaches to incorporate the practical aspects of adaptive reuse for potential end users of adapted historical buildings (Hasnain and Mohseni, 2018).

While some historical buildings have been adapted to suit new functions in a slightly pragmatic manner over the years (Powell, 1999), a critical reflection on the efficacy of the adaptive reuse approach for urban regeneration is quite recent (de Arce, 2014). There is a need for better understanding of some priority aspects that could impact the reuse of obsolete historical buildings, towards achieving justifiable resilient provincial town centres. These factors are discussed comprehensively in the subsequent sub-sections.

**Impacts of adapting vacant historical buildings in provincial areas**

Some significant impacts of adaptive reuse to provincial town centres are discussed in the following sub-sections under the headings: economic aspects, socio-cultural aspects, environmental aspects, built heritage preservation, seismic resilience, building usability and TCR.

**Economic aspects.** An adapted historical building’s new function should be able to benefit its users economically. It is often expected that the building’s new use will possess the potential to generate profit for its future maintenance. A successful adaptive reuse project should contribute to an increase in the values of property in the area, and also, boost cultural tourism (Misrhisoy and Günce, 2016). For instance, a historical building that is repurposed to serve a new function as an art gallery will enable the users to sell their products within the building’s premises, hence making the physical continued existence of the building to depend on its economic sustainability. The indicators for measuring the economic benefits of adaptive reuse projects should include: the numbers of newly established businesses and employment prospects for the local workforce; increased value of surrounding properties, and increased revenue from tourism for local businesses (Engelhardt and Rogers, 2009; Jonas, 2006; Chan and Lee, 2008).

The adaptive reuse process is usually faster and cheaper than demolishing an existing building and rebuilding it from scratch, except there is a requirement for a full structural reconstruction (Langston et al., 2007). The required time to demolish and reconstruct a given floor area of an existing building has been suggested to be about twice the time needed to redevelop the same floor area, with adaptive reuse (Johnson, 1996; Larkham, 2002). This reduced redevelopment timeframe will also reduce both the financing cost and the impact of inflation on the costs of construction (Highfield and Gorse, 2009; Langston et al., 2007). As a result, there will be less disruption to cash flow and operations of organisations that do not wish to relocate, thus reducing the expenses from temporary accommodations. Furthermore, the costs of adaptive reuse projects are usually lower than the cost of demolition and rebuild (Douglas, 2006), given that the contract periods of adaptive reuse projects are usually shorter, and also the structural materials of the existing buildings are already in place, the borrowing cost would be reduced (Shipley et al., 2006). The demolition and reconstruction of existing buildings are most often more expensive than changing the use of the building (Bullen, 2007; Shipley et al., 2006; Douglas, 2006; Ball, 2002). Additionally, the adaptive reuse approach has been demonstrated to be a preferable option in the revitalisation of the economic condition of a community through increased property values (Yiu and Leung, 2005). A Hong Kong study investigated the impact of repurposing historical buildings for new functions on a highly dense existing residential property (Chau et al., 2003). It was revealed from this study that there was a 9.8 per cent increase in the value of the property compared to another existing building in the same area that did not go through
the adaptation process (Chau et al., 2003). In another Hong Kong study, the impact of adaptive reuse on residential property was also investigated (Yau et al., 2008). Findings from the study showed that there was an improvement of 6.6 per cent in the value of the repurposed property (Yau et al., 2008).

However, there are some cases where the cost of repurposing older buildings for new functions surpasses that of a new build (Kohler and Yang, 2007); most especially, when the existing buildings have structural complexities, legislation or listing requirements (Wilkinson et al., 2009). Also, because the process of developing a new building from scratch is relatively more straightforward, its cost could be argued to be often lower than that of the adaptive reuse process (Bullen, 2007). In a study done in Canada, uncertainty and erroneous risk perception of high adaptation costs by bankers made it more difficult for property developers to secure financial support for projects relating to adaptive reuse (Shipley et al., 2006). When considering categorising the disruptions caused by the process of adapting historical buildings into indirect costs, the economic argument of adaptive reuse may be weakened (Chau et al., 2003). These disruptions could come as a result of the loss of convenience during the redevelopment process, and also the loss of goodwill from tenants into indirect costs. Also, some historical buildings may not have the capacity to reach new building regulatory standards even after undergoing the adaptive reuse process (Bullen and Love, 2011b). As a result, these buildings (especially commercial buildings) would degenerate to a state where their layout is inappropriate for change of use, making them uneconomical (Bullen and Love, 2011a, c, b; Wilkinson et al., 2009).

**Social-cultural aspects.** Socio-cultural factors would incorporate the impacts of a historical building’s newly adapted function to its local area, the quality of life within the community and other socio-cultural activities. These historical buildings help to link residents to their roots by serving as collective memory, with which they can all reflect on their personal and cultural identities (Butina–Watson and Bentley, 2007). Although socio-cultural aspects are often less prioritised for adaptive reuse projects possibly because they are difficult to measure, to achieve a successful adaptive reuse project, repurposed historical buildings should be socio-culturally justifiable (Misirlisoy and Günço, 2016). The new use of the repurposed historical buildings should be able to attend to the needs of the local community and also contribute socio-cultural benefits to its users by proposing new activities for them. A most suitable function could lead to an increase in the quality of lifestyle and education in the area (Misirlisoy and Günço, 2016). Furthermore, the adaptive reuse of historical buildings could also enhance the cultural diversity and significance of a place by promoting the continuity of societal life (Engelhardt et al., 2007).

The social merits of adapting vacant historical buildings for new functions could occasionally be provided through the core heritage values possessed by the buildings (Langston et al., 2007). Redeveloping historical buildings for other uses could go a long way in presenting attractive streetscapes that could add character, and provide a secure image and sense of status to communities (Bullen, 2007). The resultant decline in vacant or dilapidated buildings would potentially create a more vibrant community and increased living standards from revitalisation and increased investment (Esther Yakubu et al., 2017). Also, other unsocial behaviours and crime would be significantly reduced.

**Environmental aspects.** The process of repurposing historical building for new functions involves lesser material consumption, reduced energy consumption, reduced transportation energy and reduced pollution from construction, hence promotes resilient and sustainable places (Itard and Klunder, 2007). Moreover, the adaptive reuse process can contribute to climate change through reducing the emissions of CO₂ (Bullen, 2007). The change of use approach is safer in reducing the extent of environmental disturbances that may arise from hazardous materials, ground contamination, dust and hazard from
falling materials (Bullen and Love, 2010). This disturbance could cause interference with eco-systems, habitat degradation and reduced biodiversity, and hence decrease air and water quality, which could, in turn, encourage the spread of diseases to humans and animals (Koren and Butler, 2006).

Instead of owners of existing historical buildings and property developers just settling for demolition, the change of use strategy offers a better way to efficiently and effectively redevelop these buildings in a manner that will not pose any harm to the environment. Most historical buildings contain embodied energy (Binder, 2003), which could be saved by reusing the building’s functionality, components and recycled materials (Bullen and Love, 2010). Additionally, in the case of site work downtime caused by inclement weather, the adaptive reuse process could reduce this issue through the presence of work enclosure presented by the existing buildings. Also, the process of demolishing heritage buildings and rebuilding could waste materials (DEH, 2004), and also pose significant threats to environmental sustainability. Findings from a study done in the Netherlands revealed that the adaptive reuse process would lead to the generation of less waste, use of fewer materials and most likely lesser energy, as compared to demolishing and rebuilding (Itard and Klunder, 2007).

However, it has been argued that the required standards (i.e. the quality of thermal, acoustic and indoor air) of applying the adaptive reuse for existing buildings may not be attainable (Bullen, 2007). For instance, there will be varying compliance with functional standards, because it will depend on the physical state and required end use of the building (Wilkinson et al., 2009). Although adaptive reuse does not contain the creative element of a new building, creativity is, however, argued to depend on being able to fit contemporary needs into what already exists (Bullen, 2007). The performance of an adapted existing building may not completely match that of an entirely new building, but its social gain could balance this limitation (O’Donnell, 2004).

**Built heritage preservation.** Heritage preservation charters mandate that when historical buildings with heritage values are being redeveloped, their architectural and heritage character should be maintained and conserved for sustainability (ICOMOS, 1931; ICOMOS Australia, 2013). Accordingly, this mandate on heritage preservation has led to the scheduling of several heritage buildings into district plans, thereby protecting them from unsympathetic alterations or demolition through regulations. Built heritage conservation through adaptive reuse has been suggested as practical and sustainable concepts for urban regeneration planning (Nasser, 2003; Alpopi and Manole, 2013). Moreover, the adaptive reuse approach has been well thought-out as an essential strategy towards the conservation of built heritage (Jessen and Schneider, 2003). Although the benefits of repurposing historical buildings for new functions have been argued to promote built heritage preservation (Plevoets and Van Cleempoel, 2011), some literature emphasise the success of the new functions and local community development as vital adaptive reuse goals (Douglas, 2006; Rodwell, 2008; Shehata et al., 2015). The optimistic interaction between built heritage preservation, adaptive reuse and TCR is that the conservation of heritage buildings will secure successful TCR projects by safeguarding the social, economic and environmental benefits of the built heritage expenditures, through adaptive reuse (Rojas, 1999).

**Seismic resilience and building usability.** Since New Zealand is located in an active seismic region of the world, it is always important to include seismic resilience in its resilience and sustainable development plans. The purpose of seismic resilience in New Zealand’s provincial areas would be to recover or maintain functionality and create adjustments that would accommodate thriving and learning during earthquakes, while reducing the adverse effects of future earthquake occurrences in the areas (Smith et al., 2016). A provincial area could be considered as seismic resilient if it possesses the capacity to absorb and minimise the disruptive and adverse effects of an earthquake and efficiently respond to the
earthquake event (Bruneau et al., 2003). The adaptive reuse concept could be considered a feasible approach to renegotiate seismic resilience for the vacant historical buildings in New Zealand’s provincial areas as most of these buildings are being assessed as earthquake-prone (Esther Yakubu et al., 2017). Since most change of use alterations would trigger the seismic strengthening requirements of earthquake-prone buildings (EPBs) if the value exceeds 25 per cent of the building’s rateable value (MBIE, 2017), adaptive reuse could therefore serve as a useful approach to motivate building investors to retrofit these EPBs, towards creating a seismic resilient community.

Building usability is another important aspect to consider when changing the use of a historical building. According to Elzeyadi (2002), successfully reused spaces should typically reflect the following psycho-social and physical qualities: aesthetics and ambient comfort, ergonomics, and space utilisation, lighting quality, privacy, heritage value, life safety and security, temperature, maintenance services, noise and auditory levels, and relative humidity. Quite a few methodologies for the selection of optimal new adapted functions for vacant historical buildings have been developed with emphasis on the need for a strong compatibility between the spatial characteristics of the buildings and the requirements of the new adapted functions (Hong Kong Buildings Department, 2016; Langston, 2011; Langston et al., 2007). Accordingly, Hillier and Hanson (1989) have developed a model (Space Syntax) that could be used to investigate the extent to which the design alteration of historical buildings and space arrangement can address the socio-spatial and possible economic needs of the new adapted functions.

**Adaptive reuse and TCR.** TCR is a holistic and integrated approach adopted for the resolution of urban problems to generate a resilient improvement in the physical, social, economic and environmental conditions of a degenerated urban area (Roberts and Sykes, 2000). The TCR strategy is a response to the opportunities and challenges of urban deterioration in a specific place, and at a particular time (Roberts and Sykes, 2000). Most TCR strategies usually involve the group effort of local authorities, public, private and other voluntary sectors to achieve a clear aim of improving the quality of life for residents of a community. The theory of urban regeneration is primarily concerned with the organisational and institutional dynamics of managing urban change, through displaying several essential features (Roberts et al., 2016).

In the domain of TCR, adaptive reuse could catalyse the improvement of the liveability of historic precincts, which is the desired outcome of the relationship between human and environmental characteristics (Van Kamp et al., 2003). Liveability is greatly influenced by the conditions of public spaces such as streets, public facilities, parks, etc., where people can interact with one another naturally. Hence, repurposing vacant historical buildings for new functions could substantially contribute to improving the livability of provincial precincts through the stimulation of prospects for resilient and sustainable social interactions among community members (Yung and Chan, 2012). Typical liveability indicators include property values, business activities and tourism, numbers of visitors per day, community character and pride, social cohesion and equity, and diversified land use (Dale and Newman; 2009; Van Kamp et al., 2003). Therefore, embracing the adaptive reuse could provide an added benefit to the regeneration of New Zealand’s shrinking provincial town centres in a sustainable way (Esther Yakubu et al., 2017). The adaptive reuse strategy could also motivate local authorities and owners of vacant historical buildings in provincial town centres to minimise the economic, socio-cultural and environmental costs, in a quest for a continued urban development.

**Research method**
This study focuses on examining the efficacy of using the adaptive reuse approach to regenerate Whanganui’s town centre, and in doing so, identifies and explores influential factors to the usefulness of adapting obsolete and vacant historical building for new functions.
A focus group workshop was conducted with relevant stakeholders to explore their assumptions, beliefs and opinions regarding the research topic (Krueger and Casey, 2014). Closed-ended questionnaires were administered to the focus group participants to measure their opinions regarding the efficacy of the adaptive reuse approach to regenerate Whanganui’s town centre. The rationale for using the focus group technique is that it is a practically cost-effective way of gathering many data within a short timeframe, and also, the data can be easily quantified with little impact on its reliability and validity (Popper, 2005). The focus group approach also allowed the workshop participants to probe, prompt and clarify questions with the workshop facilitators.

The purposeful sampling technique was used to choose participants for the focus group workshop, based on their vast knowledge regarding Whanganui’s existing TCR pursuit. Purposeful sampling allows research to be carried out in a particular setting where individuals or events are deliberately selected to provide detailed insights on a research focus (Maxwell, 2013). This sampling approach also promotes the involvement of participants who are experienced in the subject matter (Babbie, 2013; Easterby-Smith et al., 2012; Neuman, 2014). The participant mix comprised a combination of structural engineers, quantity surveyors, architects, estate valuers, building owners/developers, legal representatives, heritage representatives and local government council representatives. The profile of the focus group workshop participants is provided in Table I. A total of 22 participants attended the focus group workshop. The administered questionnaires were exclusively completed by all participants in about 45 min and returned to the workshop facilitators.

Responses from the questionnaire survey were analysed using the IBM SPSS statistical software. The responses were collated, number-coded and manually entered into the SPSS

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<td>11–20</td>
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<td>18.2</td>
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<td>&gt; 20</td>
<td>9</td>
<td>40.9</td>
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<td>Gender</td>
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<tr>
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<td>8</td>
<td>36.4</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>100</td>
</tr>
</tbody>
</table>

Table I. Profile of focus group workshop participants.
spreadsheet with each question number as column heading and separate rows for each participant’s answers. The spreadsheet data were checked for accuracy, and the proportion of participants who selected each response was calculated and displayed on bar charts. To measure the level of internal consistency of all completed questionnaire items, a reliability test was done in SPSS using the Cronbach’s $\alpha$ technique (Tavakol and Dennick, 2011). Additionally, the Friedman (1937) test was used to check for significant differences in the effect that each perceived questionnaire item under separate priority aspects would have on the efficacy of adaptive reuse, towards Whanganui’s town centre regeneration.

**Questionnaire reliability check**

The reliability of a data collection instrument is the extent to which it consistently measures a concept. For this study, the Cronbach’s $\alpha$ test (Tavakol and Dennick, 2011) was used to assess the degree of internal consistency among the set criteria that were assessed in the questionnaires. From the following equation, the $\alpha$ coefficient was evaluated as:

$$\alpha = \frac{k \times \overline{\sigma}}{\overline{v} + \frac{(k-1)\overline{\sigma}}{k}} \geq 0.7 < 0.8,$$

where $k$ is the total number of questions; $\overline{\sigma}$ the average of the covariance that exist between all items; and $\overline{v}$ the average of the variance of items.

From the SPSS analysis, the Cronbach’s $\alpha$ coefficient of 0.706 > 0.7 (refer to Tables II–IV) indicates an acceptable level of internal consistency among all the measured items in the questionnaire.

**Friedman’s test**

The Friedman’s test was employed for this study since adaptive reuse efficacy was repeatedly measured under different priority aspects of Whanganui’s TCR plan. For this

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<table>
<thead>
<tr>
<th>No. of participants</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Valid</td>
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<tr>
<td>Excluded$^a$</td>
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<tr>
<td>Total</td>
<td>22</td>
</tr>
</tbody>
</table>

Notes: Scale: all questions on the significance of adaptive reuse to Whanganui’s town centre regeneration strategy. $^a$Listwise deletion based on all variables in the procedure

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<table>
<thead>
<tr>
<th>Item means</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
<th>Maximum/ Minimum</th>
<th>Variance</th>
<th>Total no. of questions</th>
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</thead>
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<tr>
<td>1.509</td>
<td>1.182</td>
<td>1.818</td>
<td>0.636</td>
<td>1.538</td>
<td>0.031</td>
<td>25</td>
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<tr>
<td>Item variances</td>
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<td>0.251</td>
<td>1.446</td>
<td>1.195</td>
<td>5.759</td>
<td>0.138</td>
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</table>

Note: Scale: all questions on the significance of adaptive reuse to Whanganui’s town centre regeneration strategy

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<table>
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<tr>
<th>Cronbach’s $\alpha$</th>
<th>Cronbach’s $\alpha$ based on standardised items</th>
<th>Total no. of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.706</td>
<td>0.651</td>
<td>25</td>
</tr>
</tbody>
</table>
study, the null hypothesis is that there would be no significant differences in the effect that each perceived questionnaire item under separate priority aspects would have on the efficacy of adaptive reuse. Accordingly, the decision rule would imply that if the significance value \( p \) is less than 0.05, the null hypothesis should be rejected.

**Findings and discussion**

The results from the questionnaire survey highlight factors that could influence the decision-making process of adapting obsolete and vacant historical buildings for new functions in Whanganui’s town centre. A five-point Likert scale was used to weigh the attitudes (i.e. 1 = positive attitude; 5 = negative attitude) of the focus group participants by allowing them to express the extent of their opinions, and also levels of agreement or disagreement regarding each item of the questionnaire (Likert, 1932). Responses from the SPSS analysis are provided below.

**The significance of adaptive reuse to Whanganui’s TCR strategy**

In response to the opportunities and challenges of urban deterioration in Whanganui (Roberts and Sykes, 2000), this study established the significance of using the adaptive reuse approach as a viable technique that would provide resilient town centre for the area. Adaptive reuse was considered by a significant proportion of the focus group participants to be a very effective approach to regenerating Whanganui’s town centre because it was considered a more sustainable way to promote seismic resilience, the preservation of heritage buildings, and also improve the economic and socio-cultural sustainability of the area. Accordingly, about 82 per cent of respondents believed to a large extent that built heritage preservation from adaptive reuse would drive Whanganui’s existing TCR strategy. Other adaptive reuse significant factors the respondents believed would contribute to driving Whanganui’s TCR strategy to a large extent were found to include: compliance practices to present and future earthquake requirements (69 per cent), the usability of the historical building (57 per cent) and the increased future value of building (80 per cent). As far as the structure of historical buildings remains functional, 74 per cent of the respondents believed to a large extent that adaptive reuse would be a most resilient and sustainable approach for the regeneration of Whanganui’s town centre. The high proportion of participants that believed to a large extent the usefulness of adaptive reuse through built heritage preservation imply that a conservation culture of built heritage in Whanganui would promote the socio-economic and environmental benefits of heritage expenditures through adaptive reuse. Also, most owners of old historical buildings would be motivated to upgrade their buildings, as a response to the declining usability of the buildings through adaptive reuse (Pearce et al., 2004).

Furthermore, from an economic perspective, the adaptive reuse approach was considered to a large extent by 71 per cent of the respondents to be a much faster and cheaper alternative for redeveloping historical buildings when compared to the cost and time it would take to demolish and rebuild from scratch (Johnson, 1996; Larkham, 2002). This high response regarding the economic impact on the usefulness of adaptive reuse is significant given that a reduced redevelopment timeframe will bring about the lesser impact of inflation on the construction costs, hence reduced disruption to cash flow (Langston, 2008). Also, 75 per cent of the respondents believed to a large extent that adapting historical buildings for new functions would boost the eco-efficiency of the buildings, by using low energy impact materials, well-organised heating and insulation. Additionally, 69 per cent of the respondents believed to a large extent that changing the functions of the historical buildings in Whanganui’s town centre would present an excellent opportunity to transform Whanganui’s built environment in a more aesthetically appealing way. Hence, the preserved historical buildings would promote the retention of architectural streetscapes and a maintained sense of place for the area (Hong and Chen, 2017).
Adaptive reuse prospects and obstacles relevant to Whanganui’s TCR agenda

Findings from the questionnaire survey show the proportion of respondents who strongly agreed to some prospects and obstacles that may influence a successful adaptation of historical buildings in Whanganui’s town centre. The prospects include: enhanced property market due to strategic location of building (86.4 per cent), prospects for technical innovation (68.2 per cent), increased inner-city population density (63.6 per cent), high demand for redeveloped historical buildings (77.3 per cent) and higher economic prospects in comparison to demolition and rebuild (72.7 per cent). Furthermore, when compared to a similar adaptive reuse survey carried out by Bullen (2007), the adaptive reuse approach was also significantly supported as a positive approach, and a more sustainable option that would promote the long-term usefulness of existing buildings than demolishing and rebuilding them. For the adaptive prospects, results from the Friedman’s statistical analysis ($p = 0.487 > 0.05$) imply that the null hypothesis should be retained. Refer to Figure 1, Tables V and VI for a representation of these findings.

On the flip side, the respondents strongly agreed that the following factors could serve as obstacles to a resilient and sustainable regeneration of Whanganui’s town centre: seismic regulatory requirements (81.8 per cent), heritage regulatory requirements (77.3 per cent), health and safety regulatory requirements (68.2 per cent), feasibility of reusing building materials (72.7 per cent), impact on aesthetic fabric (59.1 per cent), availability and cost of materials to match existing fittings, elements and fixtures (54.6 per cent), procedure for planning approval (63.6 per cent), non-strategic building location and marketability (86.4 per cent) and structural integrity after redevelopment (77.3 per cent).

In a similar study, some of the above barriers were also believed to impede the efficacy of adaptive reuse for existing buildings, towards sustainable urban regeneration (Bullen, 2007). The finding suggests that the location of historical buildings is a critical marketability component for adaptive reuse. For instance, a historical building sited in an unplanned location would have a lower marketability potential after a redevelopment process. Hence, this becomes a key obstacle to the adaptive reuse process. Other significant proportions of the identified obstacles were connected to regulations, which may be considered too rigid when incorporating technical and safe innovations into the adaptive reuse process. Besides, a $p$-value of 0.220 > 0.05 from the Friedman’s statistical analysis implies that the null hypothesis should be retained. Refer to Figure 2, Tables VII and VIII for a summary of these findings.

![Figure 1. Prospects of adaptive reuse to Whanganui’s TCR strategy](image)

| Mean rank |
| A1 | 2.66 |
| A2 | 3.18 |
| A3 | 3.23 |
| A4 | 2.91 |
| A5 | 3.02 |

Table V. Ranks
Efficacy of adaptive reuse to the economic viability of Whanganui’s town centre

As the identification of value for money on development projects is indeed commonly related to monetary return, respondents were asked the extent to which they believed adapted new functions for vacant historical buildings would contribute to Whanganui’s economic resilience and sustainability in the aspects of some identified economic criteria. While 68.2 per cent of the respondents believed that new functions for the vacant historical buildings would to some extent promote Whanganui’s economic viability by increasing revenue from tourism, 81.8 per cent believed to a large extent that the new function of the building would boost local commercial activities in Whanganui’s town centre. Accordingly, about 72.7 per cent of the respondents also believed to a large extent that increased commercial activities in Whanganui’s town centre from the building’s new function will trigger a corresponding increase in property and land values of neighbouring buildings.

<table>
<thead>
<tr>
<th>Table VI. Friedman’s test statistics²</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>22</td>
</tr>
<tr>
<td>χ²</td>
<td>3.441</td>
</tr>
<tr>
<td>df</td>
<td>4</td>
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<tr>
<td>Asymptotic significance</td>
<td>0.487</td>
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Figure 2. Obstacles of adaptive reuse to Whanganui’s TCR strategy

<table>
<thead>
<tr>
<th>Mean rank</th>
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<tbody>
<tr>
<td>B1: Seismic regulatory requirements</td>
</tr>
<tr>
<td>B2: Heritage regulatory requirements</td>
</tr>
<tr>
<td>B3: Health and safety regulatory requirements</td>
</tr>
<tr>
<td>B4: Feasibility of construction material reuse</td>
</tr>
<tr>
<td>B5: Impact on aesthetic fabric</td>
</tr>
<tr>
<td>B6: Availability and cost of materials to match existing elements</td>
</tr>
<tr>
<td>B7: Procedure for planning approval</td>
</tr>
<tr>
<td>B8: Non-strategic building location and marketability</td>
</tr>
<tr>
<td>B9: Building’s structural Integrity after redevelopment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table VII. Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
</tr>
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<table>
<thead>
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<th>Table VIII. Friedman’s test statistics²</th>
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<tbody>
<tr>
<td>N</td>
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<td>df</td>
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<tr>
<td>Asymptotic significance</td>
</tr>
</tbody>
</table>
The key to realising economic prospects from adaptive reuse projects is discovering the right combination of new uses for the older buildings (Plevoets and Van Cleempoel, 2011; Langston et al., 2007). The successful adaptation of an abandoned historical building could result in employment and arousal of the economic growth of the surrounding environment (Chan and Lee, 2008). For an adaptive reuse project to become economically viable, its revenue should be adequate to cover both redevelopment and running costs, with lesser or no dependence on external sources of funds, while gaining profits for the expected beneficiary groups (Bullen and Love, 2009). Such benefits which include an increase in cost recovery, productivity rate, work efficiency and increased number of visitors and tourists to an area will typically indicate how economically viable the new adapted function will be for that area (Shehata et al., 2015). Results from the Friedman’s statistical analysis ($p = 0.689 > 0.05$) imply that the null hypothesis should be retained. Figure 3, Tables IX and X illustrate these findings.

**Efficacy of adaptive reuse to Whanganui’s socio-cultural sustainability**

In total, 77.3 per cent of the focus group respondents strongly agreed that new functions for the vacant historical buildings in Whanganui’s town centre would promote the socio-cultural capability of the area through an increase in the lifecycle of the buildings. The respondents also strongly agreed that the adapted buildings would contribute to the cultural significance of the place (81.8 per cent). Moreover, while 86.4 per cent of the respondents agreed that the adaptive reuse approach would promote Whanganui’s socio-cultural aspects by creating common cultural identity for the residents of the area, 68.2 per cent of the participants agreed that a sense of belonging and attachment to the area would be felt by the residents of Whanganui if the adaptive reuse approach is adopted to redevelop the obsolete historical buildings in the town centre. These above findings suggest that apart from monetary return on investment from adaptive reuse redevelopment projects, socio-cultural aspects are becoming progressively significant (Langston et al., 2007). Also, concerns such as the functionality and cultural efficiency of historical buildings are crucial to resilience assessments in a broader social context.

**Figure 3. Efficacy of adaptive reuse to Whanganui’s economic viability**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1: Increased local commercial activities</td>
<td>2.05</td>
</tr>
<tr>
<td>C2: Increase in property and land value of nearby buildings</td>
<td>2.07</td>
</tr>
<tr>
<td>C3: Increased revenue from tourism</td>
<td>1.89</td>
</tr>
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**Table IX. Ranks**

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<td>$x^2$</td>
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<td>df</td>
<td>2</td>
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<tr>
<td>Asymptotic significance</td>
<td>0.689</td>
</tr>
</tbody>
</table>

**Table X. Friedman’s test statistics**
Correspondingly, findings from the Friedman’s statistical analysis \((p = 0.769 > 0.05)\) imply that the null hypothesis should be retained. Figure 4, Tables XI and XII depict these findings.

**Efficacy of adaptive reuse to the preservation of Whanganui’s built heritage**

When questioned about the efficacy of adaptive reuse to the preservation of built heritage in Whanganui’s town centre, 77.3 per cent of the respondents strongly agreed that the adaptive reuse approach would go a long way in promoting the retention of the visual heritage features of Whanganui’s main streetscape, while 68.2 per cent agreed to the conservation of the history and narration of the town’s existence. Also, 68.2 per cent of the respondents strongly agreed that embracing the adaptive reuse approach in redeveloping vacant historical buildings would stimulate the preservation of Whanganui’s built heritage by sustaining the architectural history of the central streetscape. Moreover, 81.8 per cent strongly agreed that the memories of the abandoned historical buildings would be preserved through adaptive reuse.

The above responses on the impact of adaptive reuse on the preservation of built heritage in Whanganui’s town centre are in line with findings from a similar survey done by Msurhsoy and Günçe (2016). The study attributed some benefits of architectural conservation through adaptive reuse to sustainable urban regeneration, hence extending the role of architectural conservation from just heritage preservation to urban regeneration and sustainable development (Bullen and Love, 2011a). Results from the Friedman’s statistical analysis \((p = 0.649 > 0.05)\) imply that the null hypothesis should be retained. Refer to Figure 5, Tables XIII and XIV for a representation of these findings.

**Conclusion**

The prevalence of vacant historical buildings in New Zealand’s provincial town centres could be considered an important drive for adaptive reuse, as this concept is a fast-growing
global topic. The study discussed in this paper examined the efficacy of the adaptive reuse approach to revitalise underutilised historical buildings in one of New Zealand’s major provincial areas, as a substitute for cosmetic maintenance or demolition and rebuild of these buildings. The practicality of the adaptive reuse approach endorses the potentials of Whanganui’s disused historical buildings in a manner that is both resilient and sustainable. The majority of responses from this study emphasised the usefulness of adaptive reuse within the priority aspects of Whanganui’s existing TCR strategy. Given that the significance, prospects and obstacles of adaptive reuse, and its efficacy on economic, socio-cultural and built heritage preservation aspects with regards to the regeneration of Whanganui’s town centre were also highlighted. The study reported a high proportion of respondents that strongly agreed to the positive impacts of adaptive reuse, which justifies the efficacy of this approach in delivering a vibrant town centre for Whanganui. Also, findings from the Friedman’s analysis suggest that no significant differences existed among all measured adaptive reuse efficacy criteria by the workshop participants, therefore justifying the approach.

The participants of the focus group workshop strongly believed that the adaptive reuse process would be able to create an economically viable town centre for Whanganui, and also, building owners and investors would most likely be able to get a return on investment after redeveloping their historical buildings. Also, the preservation of built heritage through adaptive reuse would help to maintain the cultural identity of vacant historical buildings in provincial town centres in New Zealand by providing a new life for the buildings. The adaptive reuse process should not in any way interfere with the heritage values of existing buildings, especially in situations where the components and materials that were originally used to construct the buildings are no more readily available and have to be specially manufactured. While the adaptive reuse approach is important in a quest to attain low-level energy consumption and environmental sustainability goals (Thomsen and Van der Flier, 2006), it should not be considered in isolation from environmental issues (Misirlisoy and Günçe, 2016).

![Efficacy of adaptive reuse to Whanganui’s built heritage preservation](image)

**Table XIII.** Ranks

<table>
<thead>
<tr>
<th>E1</th>
<th>E2</th>
<th>E3</th>
<th>E4</th>
</tr>
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<tr>
<td>2.30</td>
<td>2.52</td>
<td>2.68</td>
<td>2.50</td>
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**Table XIV.** Friedman’s test statistics

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<th>N</th>
<th>$\chi^2$</th>
<th>df</th>
<th>Asymptotic significance</th>
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<td>3</td>
<td>0.649</td>
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</table>
The high proportion (81.8 per cent) of participants that strongly considered seismic regulatory requirements as an obstacle to adaptive reuse suggest that a better understanding of its efficacy by potential building owners and investors would serve as a very good start to motivate these stakeholders in strengthening EPBs, towards developing seismic resilient communities. Furthermore, since the adaptive reuse of historical buildings is still a developing seismic resilience concept in New Zealand, it could be made more attractive to building owners and investors through the introduction of legislation that will minimise planning and building code requirements, and also incorporate flexibility in the design of new buildings to be able to accommodate new functions for the buildings in the future. Accordingly, there is an urgent call for the development of policies and strategies that will promote adaptive reuse for the resilient and sustainable redevelopement of historical building stock, towards regenerating shrinking provincial town centres in New Zealand. Moreover, some array of options need to be well evaluated by building owners and developers when considering using the adaptive reuse approach to redevelop their buildings for new functions.

However, some doubts regarding the efficacy of adaptive reuse may still exist due to too much concentration on only economic aspects by potential investors and developers. Raising awareness by educating the public on other potentials of adaptive reuse, such as socio-cultural, environmental and heritage preservation aspects, would go a long way in promoting resilient and sustainable urban areas through adaptive reuse. Besides, in the course of this study, some questions regarding developing an adaptive reuse strategy to balance the diverse interests of different stakeholders involved in an urban regeneration decision-making process emerged. These questions would be addressed in future research. A community approach to stakeholder engagement should be considered in typical adaptive reuse decision-making processes, to identify and select the most appropriate new functions for underutilised historical buildings, based on the identified needs of the communities. Adaptive reuse should, therefore, be embraced by building investors/owners, building professionals, local authorities and communities, as a justifiable resilient and sustainable approach towards regenerating shrinking town centres in New Zealand and other parts of the world.

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Hong Kong Buildings Department (2016), Practice Guidebook for Adaptive Re-use of and Alteration and Addition Works to Heritage Buildings, 2nd ed., Heritage Unit, Buildings Department, Hong Kong.


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