The challenges of land development for housing provision in New Zealand

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Abstract

The land development process in New Zealand is criticised for causing delays in the delivery of adequate housing. These delays upset the demand and supply equilibrium, leading to housing shortages, expensive builds and rentals. This study investigates the challenges in land development, to ascertain the factors that are limiting its efficiency as a major catalyst to housing provision. An understanding of the complexities of the development process could enable the suggestion of feasible solutions for achieving housing goals. A two-stage process was adopted to achieve this study objective. In stage one, a critical review of relevant literature helped to identify 48 measurement items. Those items were included in a questionnaire survey in the second stage, to gather data from stakeholders involved in land development process in New Zealand. Using relative importance index (RII) method, nine significant challenges were identified, which were then categorised and discussed in accordance with the construction stakeholder groups that are responsible for creating those challenges. The nine major challenges are: delay in reviews and approval of documents; scope change; lengthy consent application processes; late response to queries by regulatory authorities; poor interaction between regulatory authorities; poor coordination within regulatory authorities; poor planning and scheduling; design errors and slow progress during design development. Findings of this study highlight the need for the development of proper workplan for consent processing, reasonable factoring of the risks associated with scope changes in the land development process, and the enhancement of project management skills of land development contractors.

Keywords Challenges · Housing provisions · Land development · New Zealand

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1 Introduction

The pattern of land development is influenced by many factors including but not limited to population growth, economic development, and community formation (Rittenberg, 2012). It is a sophisticated process of converting raw land into land segments that are suitable for development, with utilities such as water supply, sewerage, gas and electricity, provision of streetlights, footpaths, curbs and streetscape, construction and naming of local streets and sections with legal titles (McDonagh, 2010).

The use of land to support housing programmes is well known with several jurisdictions addressing housing challenges with their planning systems (Austin et al, 2014) Austin et al. suggests a convergence of strategies by countries to use planning systems to address housing shortages. In recent years land use for residential development in New Zealand has become a topical issue. The process has been criticised for being slow and for upsetting the demand supply equilibrium in housing provision in New Zealand (Eaqub, 2018). Several projects in New Zealand experience delays in their delivery due to land development issues. A few examples are provided in Table 1 to show the magnitude of schedule and cost overruns on some construction projects. Overruns seem relative to the sizes of the subdivisions with 100% schedule overrun on land being developed for 500+ houses for example. The objective of this study is to ascertain the causes of the challenges being experienced in land being developed for housing provision in New Zealand. The study is particularly important as New Zealand Government has an ambitious plan to build 100,000 new homes by 2028 (HNZ 2017) to balance projected housing demand. An initiative called 'KiwiBuild' was rolled out in 2018 to meet governments' housing targets. The initiative started with a preliminary target of building 1,000 houses by June 2019, but by July of 2019, only 300 homes were completed (Twyford, 2019). This is further evidence of the magnitude of issues connected with housing delivery.

The predominant regulation controlling land development for housing supply in New Zealand is the Resource Management Act (RMA). The RMA came into effect in 1991 and facilitated the transition of prescriptive zoning to performance-based planning where 'resource consents' are required for property developments (Baker et al., 2006). Following this, 14 regional councils were established based on catchment areas under the RMA as consenting authorities. Spiller (2003) had critiqued New Zealand's transition to performance-based planning, for transaction and compliance costs for developers and delay in processing due to the lack of training and skills at the regional councils. These inadequacies meant that councils had to be dependent on private sector consultants, resulting in longer than anticipated processing times and high administration costs. Similarly, Ericken et al. (2004) suggested that the RMA could not deliver the performance-based plan as efficiently as was expected. The RMA continues to be under scrutiny for imposing costs and delays on activities (Clough et al., 2018) became an impediment to housing delivery.

Table 1 Impact of delay in land development projects in Auckland, New Zealand

Project	1	2	3	4
Suburb	Flatbush	Massey	Te Atatu	Swanson
No. of Land Sections	40	500 +	8	29
Year of Completion	2019	2019	2019	2018
Schedule Overrun	92.6%	100%	75%	58.3%
Cost Overrun	25%	20%	31.6%	62.7%

Recently, Tustin (2017) suggested legal interventions for the deregulation and reform of the RMA to achieve density and increase housing options. RMA has come under increasing scrutiny over whether it appropriately balances the needs of development and environmental protection. RMA applications process for local plan changes or consents for new land uses or discharges into air and water, is neither time efficient nor cost effective. Hence there is a need to investigate the factors that are limiting the efficiency of land development process and propose solutions to the prevailing issues. In-depth literature review is presented in Sect. 2 of this paper to highlight the land development and housing provisions in New Zealand and the associated challenges. Section 3 discusses the methodology adopted for this study, discussion on results and findings is presented in Sect. 4. Last section, Sect. 5 concludes the study findings, flags the limitations and presents the recommendation for future research.

2 Land development and housing provisions in New Zealand

2.1 Land development

In New Zealand, land development is a complex process and it usually takes longer than the set time frames. The process begins with a complete topographical survey and a scheme plan, which are essential requirements for applying for resource consent (IPENZ, 2007). In resource content applications, concept plans developed by design consultant are required to be submitted for review by Councils (Auckland Council, 2019). Getting resource consent leads to development of a detailed engineering plan complying with resource conditions. This engineering plan is approved after review and is known as the EPA (Engineering Plan Approval). After EPA is issued, the land development process can commence (Sutherland, 2019). Land developments need to follow consenting authority's protocols such as: requirement of minimum lot size, building platforms, yard setbacks, height restrictions and provision of utilities including water, power and fibre optics along with wastewater and storm water disposal. This is followed by obtaining 224c certificate from the consenting authority, that confirms the regulations (LGA 2002). According to MPI (2019), public involvement in decision-making processes is encouraged by the RMA. Figure 1 captures the entire land development process in New Zealand.

Complexity of the land development process can be resolved through efficiency of operations and with key stakeholders playing a vital role in overcoming the challenges of land development.

Figure 2 presents the flow chart of the land development and construction phases along with approval and construction in detail. The stakeholders in the process are identified such as: consultants, contractors and regulatory authorities, and the different stages within the process for which their input is required are indicated.

Approval of land development from regulatory authorities require liaison with other departments to carefully weigh the impact of developments (Memon & Thomas, 2006). Figure 3 explains the flowchart of the application process and shows the internal communication that occurs with different departments before the approval is granted by a regulatory authority.

Furthermore, Fig. 4 shows typical procedure adopted for the approval of 224c stage certificates, showing the involvement of various regulatory authorities. Applying for Sect. 224c (s224c) certificate with a regulatory authority is the last step in the land

Fig. 1 Land development process in New Zealand

Fig. 2 Role of stakeholders in land development and construction process

development process, which certifies that all subdivision conditions have been met and a survey plan has been approved under s223 for those subdivisions. Certificate s224c is required, to obtain a Certificate of Title from Land Information New Zealand (LINZ). S224c certificate involves gathering different documentation from various public departments (traffic, telecom, power, roads), making its documentation more onerous. A pictorial view of the typical application process is presented in Fig. 4. Awareness of the process is

Fig. 3 Flow chart of internal communication within regulatory authority

equally important for all major stakeholders, otherwise these become pinch points in the application process. Meeting the requirements for each process and submission of documents on time become critical activities. Not adhering to any part of the procedure makes it difficult to get a s224c certificate (LINZ 2018).

2.2 Challenges of land development

Hasan et al. (2014) carried out investigations on case study projects from different countries and regions and documented that the challenges faced by land development stakeholder are different in each region or country, but all those challenges result in process delays. Emam (2015) also argues that for different project types, the nature of challenges is different. Similar kinds of projects, in different countries and locations could have different factors that pose challenges, that could result in delays in project delivery (Ramanathan 2012). Furthermore, construction industry in countries that are densely populated operate differently from countries those are sparsely populated, and hence the reasons for delays in these situations may be different as well (Doloi, 2012).

A New Zealand specific study (Lessing, 2017) investigated the critical factors that result in delay in building construction projects and observed that unforeseen ground conditions, documentation, late revisions, approval of design documents, unclear drawings are the most common causes of delay. However, since the supply of buildings comprise two stages i.e., land development and construction phase and both stages have different sets of challenges, it is equally important to investigate the causes of delays in land development stage (Andersen & Fagerhaug, 2006). Over the years, increasing complexity of construction projects and client's requirements have made land development a complicated process, these have also led to delays and cost overruns in land development (Honrao, 2015). Furthermore, availability of land for development and housing is a source of concern. New Zealand has a complex project management processes around land development and house construction phases (Berke et al., 2002). Both the land development and house construction phases are interdependent, with EPA for land development being mandatory for

Fig. 4 Complexity of approval process within regulatory authority

carrying out the detailed design for construction. While construction cannot be executed prior to the completion of land development (Sutherland, 2019).

Land development depends hugely on the provision of infrastructure, facilities, and allied services and hence the challenges faced during the land development are somewhat similar to the difficulties encountered in infrastructure projects. Any delay in land development process has significant implications on project cost and delivery schedule. Projects' completion costs are generally increased by delays, resulting in losses to developers who pass this on through increases in sale price (Albatsh, 2015). Thus, delay in project delivery impacts both clients and contractors, resulting in problems and disputes (Chan et al., 2004). It is well established fact that project success is an outcome of balancing budget, deadlines and quality (Haughey, 2011).

The challenges to the land development process can be categorised in terms of key stakeholders responsible for them; these stakeholders are consultants, contractors, and regulatory authorities. Regulatory authorities are blamed for the delays owing to the lack of clarity and complexity of the guidelines of the Resource Management Act (RMA) (MFE 2019). Complexity of these guidelines makes the review and application process time-consuming. The RMA has complicated application and approval processes for land development, approval process is heavily dependent on the stakeholders, their knowledge, skill sets and decision-making ability (Berke et al., 2006). Berry et al. (2018) records that processes under RMA are time-consuming, complex and usually do not align with available resources. The application process for resource consent is lengthy, there are three main stages in the application process involving preparation of Assessment of Environmental Effects (AEE), consultation with affected parties, pre-application meetings and getting professional help. Several inter and intradepartmental communication is involved in the approval process. For instance, resource planners have to coordinate four departments before completing their assessment of resource applications. Due to the need for efficient coordination and means of communication, these add to the application processing time. Land subdivision lies on the critical path of the development process. Therefore, issues can arise due to inadequate attention, delays in obtaining resource consent, rising construction costs, overpricing, selecting an inefficient sales methodology and lack of recognition of sustainability and knowledge of the market (Berry et al., 2019). Some of the common reasons for delays that originate from consultants are design errors and slow progression during the design stage.

2.3 Housing Provisions

In New Zealand, housing provision is at crises levels. There is a need for 70,000 more houses to meet current shortfalls, with more than half of these needed in Auckland alone (Nichols and Miller, 2017). The housing crisis is aggravated by increasing house prices which make them unaffordable. The median house price is around \$639,000 nationally but \$848,000 in Auckland region. Despite Covid-19 impact there is a 9.2% increase in median house price across New Zealand, which has surpassed the previous annual increase of about 5.8% (REINZ, 2020). The New Zealand Government produced an overly ambitious plan in 2017 to build 100,000 decent quality, affordable and healthy homes by year 2028 with a \$2 Billion KiwiBuild Scheme to create a balance between housing demand and supply. However, by 2019, Government had dropped the KiwiBuild scheme as only 300 houses were able to be completed by July, 2019 out of the 100,000 planned (Gibson, 2017).

To address the housing problem in New Zealand, there have been suggestions for changes to national and regional policies. One suggested approach is to significantly cut immigration numbers to check the demand spike for houses, although there is no evidence to suggest that immigration numbers significantly influence house prices (Kennedy, 2009). Changes to property investment regulations to reduce the attractiveness of rental investment is yet another suggestion as a demand-side solution. The latter was a main thrust of party campaigns at the 2017 elections in New Zealand. Another line of suggestion relates to improving access to finance to a wider range of citizens for new home ownership thus creating a different subset of demand. Demand side issues are outside the scope of the current investigation.

From a supply side perspective, urban intensification is now being implemented to improve housing supply and its affordability (Squires, 2017). The NZIER (2015) had suggested that intensification could help urban sprawl and the associated problems with infrastructure provision. Access to land in adequate quantity is paramount to housing policy initiatives in New Zealand. The inability of government to achieve its KiwiBuild objectives may not be unconnected with land availability. PWC (2018) had suggested that there has been constrained access to readily available land which has all infrastructure in place. Some of these constraints are imposed by national and regional policies and land covenants which effectively prevent urban intensification and correspondingly unsustainable urban communities. A discussion document prepared by DIA (2019) noted the barriers and implementation difficulties in sustainable urban development (housing inclusive) in New Zealand. In relation to land supply, some of these barriers include limited coordination of planning and implementation for large scale urban developments; ineffective integration between land use and general infrastructure planning (the sort of issues discussed in this study); and the duration and nature of planning and development control procedures. Further, DIA (2019) submits that fragmented land ownerships may have to be re-adjusted or in extreme cases acquired, because such ownership structures could prevent land from being used for significant projects (such as in large scale housing developments). In summary, Berry et al. (2019) have indicated that little attention has been paid to overcoming the challenges associated with the constraints posed by land development processes in New Zealand. The current study therefore finds its relevance.

3 Research method

This study investigates the challenges of land development for housing provisions in New Zealand. It is aimed at providing a reference resource for creating an understanding of the challenges so that feasible solutions can be suggested for the achievement of housing policies in New Zealand.

The study adopted a two-stage process for collecting data required for analysis. The first stage was the critical review of literature relevant to the subject matter to underpin the study, providing context and expounding the knowledge gap. The critical review comprised both qualitative and quantitative information for the study investigation, although details of the literature analysis is outside the scope of the current study. Essentially the critical review provided theoretical underpinning to the study (Sylvester et al., 2013) and was necessary to synthesise literature in the field (Paré et al., 2015) so that the study could hone on key knowledge gaps. In this study, knowledge of intervention-based solutions to land development that could reduce inefficiencies in housing

provision was considered pertinent. There were 48 limiting factors identified from literature and the corresponding parties that are responsible for the issues arising in land development.

The second stage involved a survey designed to gather information from stakeholders involved in land development in New Zealand (project owners, consultants, contractors, and the regulatory authorities). An online survey questionnaire was the instrument for gathering information on the relative importance of identified factors. The online survey (SurveyMonkey) helped to achieve anonymity in the responses, hence reducing response bias (Engel & Schutt, 2016). Key questions were generally close ended for quicker response and ease of coding (Creswell, 2014). The questionnaire comprised two main sections, one on the demography of the respondents and the other on the challenges of land development in New Zealand. The 48 measurement items were obtained from prior critical review of literature. The questions were largely in the form of Likert scales, with five-point bipolar responses: (5) strongly agree, (4) agree, (3) neither agree nor disagree, (2) disagree, and (1) strongly disagree. Five point Likert scale was adopted for the purpose of scaling the importance of land development challenges following the recommendations of Bryman, (2016). The questionnaire was pre-tested by eight industry stakeholders (with equal representation of each stratum: owner, consultant, contractor, and regulatory authority). Pre-testing was necessary to check on the reliability and validity of the research instrument. Reliability ensures that the instrument measures the concepts it is supposed to measure, consistently and without bias (Sekaran & Bougie, 2016). The validity, on the other hand ensures that the instrument has tapped the concept it seeks to measure by including enough items that could operationalise the concept (Dikko, 2016; Ghauri and Gronhaug 2005). The questionnaire was updated by rephrasing some of the factors for better clarity, based on the feedback obtained from the pre-test. When the responses were collated, reliability was further determined through a common measure of internal consistency for Likert questions, Cronbach's Alpha.

Since the study sought participation of construction industry experts who have direct involvement in the land development process. A snowball or chain-referral sampling approach was used by sending the survey link to industry experts to increase participation of typically hesitant construction industry units of analysis. Denscombe (2014) has commented on snowball sampling method be an efficient way of data collection, that has the potential to increase the number of participants. The snowball sampling was initiated by contacting the eight industry experts to pre-test the developed questionnaire survey. The participants who pre-tested questionnaire survey later on helped in identifying and inviting other experts to participate in the study. Consequently, the respondents grew from the first eight involved in the pre-test to another 31 who completed the actual survey. However, only 28 useable responses were included in the analysis. Low study sample is a limitation of this study, research team made every effort to increase the survey responses including reminders to participants to complete survey and refer the survey to other experts and widely spreading the request to participate among the subject matter experts. Small sample size however can be counterweighed by the fact that, 75% participants have more than 5 years of direct involvement in land development business and they are well aware of current industry issues.

The analysis involved the calculation of Relative Importance Index RII, to rank the identified challenges in order of their importance following Gunduz et al. (2014) and Sambasivan and Soon (2007). RII was calculated for each of the 48 challenges encountered in land development process using the formula in Eq. 1.

$$RII = \frac{5(n5) + 4(n4) + 3(n3) + 2(n2) + n1}{5(n1 + n2 + n3 + n4 + n5)} \quad (1)$$

where, RII is the relative importance index; $n1$, $n2$, $n3$, $n4$, and $n5$, are the number of respondents who selected: 1, for strongly disagree; 2, for disagree; 3, for neither agree nor disagree; 4, for agree; and 5, for strongly agree, respectively.

The RII values calculated range from 0 to 1, the higher the RII, the higher was the agreement by respondents that the factor was a cause of delays and inefficiencies to land development (0 not inclusive). Following Akadiri (2011), five important levels are transformed from the RII values: high (H) ($0.8 \leq RII \leq 1$), high-medium (H-M) ($0.6 \leq RII \leq 0.8$), medium (M) ($0.4 \leq RII \leq 0.6$), medium-low (M-L) ($0.2 \leq RII \leq 0.4$) and low (L) ($0 \leq RII \leq 0.2$).

4 Discussion of results and findings

4.1 Demographic information

As indicated in the previous section, there were 28 useable responses received after the questionnaire survey. A summary of the demographic information collected is presented in Table 2. It was necessary to ensure participation by those who have had active involvement in land development for housing supply in New Zealand. Four groups of participants were envisaged, but only three: clients, consultants, and contractors responded. The analysis is based on responses from these three categories of organisations. Most of the respondents (75%) have more than five years of involvement in land development (work experience). A significant percentage of the respondents are in top management (43%), followed by middle management staff (54%). The participants' work experience and their role in land development projects is significant to the questionnaire survey's reliability and validity. Therefore, from the calibre of these study respondents, it would seem that the opinions expressed, have been collected from competent sources.

Table 2 Demographic information

Category of respondents	Frequency	Percentages
<i>Organisations</i>		
Client	2	7
Consultant	17	61
Contractor	9	32
<i>Cadre/Position</i>		
Top/Senior Management	12	43
Middle Management	15	54
Lower Management	1	4
<i>Work Experience</i>		
Less than 5 years	7	25
5 – 10 years	12	43
Over 10 years	9	32
N=28		

4.2 Data analysis—internal consistency

The internal consistency of the questionnaire was tested by calculating the Cronbach's Alpha for the useable dataset. Cronbach's Alpha is a common measure of internal consistency used for dichotomous Likert questions (Howitt & Cramer, 2008). Cronbach's Alpha coefficient ranges in value from 0 to 1, with higher values denoting increased reliability. Using SPSS software, an Alpha coefficient value of 0.933 was obtained. Cronbach's Alpha value of around 0.70 or higher is widely considered desirable in science research (Taber, 2018). Hence, the value obtained indicates a high level of internal consistency for our scale, with this specific sample and instrument having a high degree of reliability.

4.3 Data analysis—relative importance and ranking

The perception of respondents on 48 challenges that could hamper land development for housing in New Zealand was sought. The computed relative importance indices RII using Eq. (1) and subsequent rankings are presented in Table 3. The table has also included in column 2 the stakeholders responsible for the respective challenges, based on the literature review. To ascertain the most significant challenges for consideration, the criteria suggested by Akadiri (2011) was used. Hence from the overall list of the challenges investigated, high importance will be ascribed to those with RII values equal or above 0.80. From Table 3, it is observed that the major challenges in land development in New Zealand as expressed by the study participants and the following:

- Delay in reviews and approval of documents
- Scope changes
- Lengthy consent application processes
- Late response to queries by regulatory authorities
- Poor interaction between regulatory authorities
- Poor coordination within regulatory authorities
- Poor planning and scheduling by the contractor
- Design errors
- Slow progression during design development

Table 3 shows that the stakeholder responsible for five out of nine (56%) of the major challenges in land development is the regulatory authority. This is followed by three out of nine (33%) consultants, one indicated as a client/consultant related challenge. Finally, one out of nine (11%) of the challenges is ascribable to contractors. A generalised discussion of the nine major challenges is made under the following sub-headings corresponding to the responsible stakeholders identified.

4.4 Challenges posed by regulatory authorities

There are five significant challenges found in the study to be caused by the activities or in-activity of regulatory authorities. "Delay in reviews and approval of documents",

Table 3 Relative importance indices and ranks

Challenges in Land Development	Stakeholder Responsible	RII	Ranking
Delay in reviews and approval of documents	Regulatory Authority	0.902	1
Scope changes	Client/Consultant	0.893	2
Lengthy consent application processes	Regulatory Authority	0.866	3
Late response to queries by regulatory authorities	Regulatory Authority	0.857	4
Poor interaction between regulatory authorities	Regulatory Authority	0.839	5
Poor coordination within regulatory authorities	Regulatory Authority	0.838	6
Poor planning and scheduling by the contractor	Contractor	0.830	7
Design errors	Consultant	0.813	8
Slow progression during design development	Consultant	0.800	9
Unreasonable project timeframe	Client	0.795	10
Poor progress control by contractor	Contractor	0.786	11
Low workforce productivity	Others	0.777	12
Discrepancies between specifications and drawings	Consultant	0.768	13
Late issuance of drawing details	Others	0.765	14
Poor technical skills of project team	Contractor	0.759	15
Long lead items for deliveries	Consultant	0.750	16
Unforeseen weather conditions	Others	0.741	17
Unexpected subsurface conditions	Client	0.741	18
Bad project estimation by contractor	Contractor	0.741	19
Rework and defective construction work	Others	0.740	20
Delayed possession/land hand-over	Contractor	0.732	21
Inefficient quality control systems	Contractor	0.723	22
Shortages of technical/professional skills	Others	0.722	23
Shortage of labour	Others	0.721	24
Site inspections delay by regulatory authorities	Regulatory Authority	0.720	25
Coordination challenges between contractors and sub-contractors	Contractor	0.714	26
Slow decision making by consultants	Consultant	0.712	27
Insufficient experience of contractor	Contractor	0.705	28
Unclear or undefined positions of services networks in drawings	Consultant	0.688	29
Procurement and procedural challenges for long lead items	Contractor	0.687	30
Bad project estimation by consultants	Consultants	0.686	31
Delay in progress payments by client	Client	0.650	32
Shortages in construction material	Others	0.680	33
Delay in approval of shop drawings and sample materials	Consultant	0.670	34
Poor coordination with the council by consultants	Consultant	0.662	35
Tendering system employed	Client	0.661	36
Long lead time (order g to manufacture)	Regulatory Authority	0.660	37
Slow response to contractor inquiries	Consultant	0.650	38
Improper technical study during the bidding stage	Contractor	0.644	39
Delay in site mobilization	Contractor	0.642	40
Delay in issuance of change orders (variations)	Consultant	0.633	41
Delay in claims processing	Consultant	0.630	42
Contractors cash flow problems	Contractor	0.600	43

Table 3 (continued)

Challenges in Land Development	Stakeholder Responsible	RII	Ranking
Fluctuation in material prices	Others	0.573	44
Contractors payment problems with employees	Contractor	0.571	45
Contractors payment problems with subcontractors	Contractor	0.570	46
Equipment shortages	Others	0.540	47
Force majeure	Others	0.530	48

with an RII of 0.902, is perceived as the most significant challenge associated with the development of land for building projects in New Zealand.

Documents herein relate to consent and compliance applications for the design and installation of lifelines and infrastructure such as: power, communication, drainage and sewage systems. These require Council approvals and very often resource consents because of their environmental implications. “Lengthy consent application process”, “late response to queries by authorities” and “poor interaction between regulatory authorities” and “poor coordination within regulatory authorities” were ranked third to sixth by the study participants respectively. Generally, regulatory authorities are key stakeholders responsible for these, for which bureaucratic requirements have had the tendency to delay approval processes.

This study findings confirm arguments that consent processing is noted for being bottlenecks to housing delivery, highly stressful and causing unnecessary waste of time (Duncan and Brundson, 2017; Flaws, 2019 and Grimes and Mitchell, 2015). Some of the constraints are linked to procedural rules and regulations, for example any amendment or adjustment to subsisting unitary plans are a nightmare to facilitate (MoE 2010). A discussion document produced by Infrastructure New Zealand (2017) has argued that growth management policies in the Auckland region in New Zealand are flawed and unwittingly prevent access to large supply of land for development. Essentially growth in most urban cities of New Zealand are constrained by regulation (zoning policies) and in a city like Auckland, has been the reason for inadequate housing numbers, continuous traffic congestion and costly living (INZ 2017). Similarly Grime and Mitchell (2015); and Mayer and Somerville (2000) have found that planning rules, regulations and council actions impact on development costs significantly. During project development cycles the feasibility and design stages can drag on into the long-term thus escalating costs. The cost centres usually reflect the cost of risks and uncertainties associated with the consenting procedures (Mayer & Somerville, 2000).

Furthermore, this study participants have indicated that coordination between regulatory authorities are a source of challenge as well as within respective regulatory authorities. This finding confirms current challenges being experienced in the area of land supply, development capacity and infrastructure provision. These challenges have necessitated several interventions. For example, there are ongoing initiatives to address undue constraints to the supply of land and infrastructure, which could make room for the growth of most urban areas in New Zealand. One of these initiatives is the Urban Growth Agenda UGA (MHUD 2020) which focuses on ensuring integrated planning between different regulatory authorities. The UGA is also seeking legislative reform that could ensure that regulatory, institutional and funding settings are collectively supporting identified UGA objectives.

4.5 Challenges posed by consultants (and clients)

Scope changes during construction work was ranked second with an RII of 0.893. This is an insightful finding considering that the project owners themselves are being indicted in the inefficiencies surrounding land development process in New Zealand. It would seem from anecdotal evidence that there is no gain to the client in delaying the decisions on their investments as there is a considerable cost (e.g. sunk cost) connected with lengthy development processes. It can be assumed that there are secondary effects connected to any scope change, in that there could be requirements to re-submit designs for approvals by regulatory agencies. Zidane and Andersen (2018) studies on major projects in Norway ranked design changes during construction, change orders, clients' lack of commitment and/or clarity of goals and objectives, in the last quartile of a list of 11 factors that cause time issues. Scope creep would seem common to major construction projects (Schneider, 2017) and are the leading cause of project failures (Hussain, 2012). Ajmal et al., (2019) provided some common cause of project scope creep to include: project complexity, uncertainty, interrelatedness of project tasks, poor specifications, risks, communication, poor stakeholder management, project complexity and environmental complexities. In the context of the current study, similar factors, either in isolation or combination could cause changes to design requirements during land developments.

Finally design errors and the slow progression of design development (RII=0.813 and 0.80 respectively) that have been ascribed to consultants are ranked highly in this study to cause challenges in land development in New Zealand. Considering slow progression, the nature of most land development projects will necessitate the involvement of multidisciplinary and temporary organisations. Considerable information and knowledge sharing will be expected to occur in such circumstances but is often found lacking (Salas et al., 2017). Ekström et al., (2019) have advocated for a change in construction project culture to embrace more collaboration and social interactions amongst project delivery teams, so that they are able to solve mutual issues.

4.6 Challenges posed by contractors

The last of the group of challenges are ascribable to contractors involved in the delivery of land development projects. Ranked 7th on Table 3, poor planning and scheduling by the contractor (RII=0.83) deserves focus in the delivery of development projects. Anecdotal evidence suggests that the set of activities connected to land development projects are often challenging to accurately forecast. Hence considerable flexibility is required in plans and schedules to respond to both foreseen and unforeseen work conditions. For example, earthworks during land development demand special emphasis on environmental impact. Physical work execution requires continuous monitoring and the plans and schedules updated regularly to keep project deliverables achievable. Land development projects comprise of series of interwoven activities. They are complicated because of the number of stakeholders involved and the series of interfaces that are involved. It, therefore, requires a particular skill set of contractors (and their project managers) to plan, coordinate and deliver to owners' satisfaction. Skills, tools and the knowledge of project managers are important in keeping projects on schedule (Oke et al., 2017). Lack of competencies in project managers' soft skills have been shown to be a main cause of construction project failure (Ling et al., 2009). Those soft skills are mostly behavioural in context but have much influence on the

organisational, social and psychological work environment. According to Fisher (2011) it is important that project managers understand behavioural characteristics of their workforce, be culturally aware, be able to lead and influence others, have an authentic behaviour, and able to manage conflicts. Mouchi et al. (2011) and Zuo et al. (2018) conclude that those soft skills are critical success factors in construction projects. Similar assertions can be made for land development projects, with their unique set of challenges and complex requirements, their project managers must drive planning and scheduling activities to ensure successful performance.

5 Conclusion and recommendations

This study aims to identify the challenges in land development projects in New Zealand, so that those challenges may be alleviated to enhance the provision of adequate housing. A two stage process was employed for collecting data for the study. One involved critical review of literature and the other a survey research designed to collate opinions from land development stakeholders. This resulted in generation of 48 measurement items (challenges), out of which nine most important challenges emerged. The analysis of the responses was conducted using Relative Importance Index (RII). The nine challenges were discussed, based on the stakeholders that were responsible for creating those challenges. Hence, regulatory authorities, project owners and their consultants and contractors were the focus of the current investigation.

The current research investigation is insightful as it relates specifically to the challenges in land development and the consequential effect that this could have on housing provisions. From the findings, it is concluded that challenges were connected to compliance (for building and resource utilisation), frequency and magnitude of scope changes, practice procedures, and poor integration amongst key project participants. Regulatory authorities were the most responsible out of the three stakeholders identified. This is followed by owners and their consultants and lastly, the constructors themselves.

From these findings, the study recommends that proper work plans for consent processing should be developed within the departments of regulatory authorities. The generality of the challenges in land development relates to the bureaucracies and procedural bottlenecks for submitted applications and for adjusted/revised submissions. There should have been benefits had from historical experience that could make procedural requirements flexible and eased off. We contend that instead of being reactive, regulatory authorities must proactively approach their compliance responsibilities and to ease off some of the bureaucracies using innovative digital tools and technologies, for instance. We suggest that at peak times, tasks could be outsourced to approved agents to prevent delays, and at downtimes, teams could be re-deployed in a manner that a good balance in resource levels could be maintained for consent processing. There are assertions within literature of constraints posed by planning regulations and policies that prevent access to developable land in the first instance, and where those lands are available, converting them into habitable sections (Ericksen et al., 2017). A legislation that has been the source of bottlenecks in land development is the Resource Management Act 1991 (RMA). Parker (2021) explains that this is currently undergoing reformation, with suggestions of repeal and replacement with more nimble legislation in New Zealand. Pertaining, owners and their consultants, this study recommends that prominence be given to the consequences of scope changes during the design development stages. There are risks associated with scope changes which would

need to be reasonably factored into the land development process so that deliverables are not over-estimated. Clients are particularly guilty of demanding scope changes, that would need to be managed appropriately. A key suggestion to clients and the design development teams, is to allow enough time during the planning phases of development projects, for anticipating requirements and future-proofing project deliverables. That way, the incidences of scope changes may be significantly reduced. Future empirical studies may focus on the functional relationship between land development challenges and successful housing delivery in New Zealand. That way, a more predictive approach to land development may be realised. Furthermore, tasks must be managed well so that interactions between teams are collaborative rather adversarial in land development. For example, the lack of integration between design consultants has a higher likelihood of constraining the provision of land for building construction. Procurement approaches that promote collaborative rather than adversarial relationships are strongly encouraged. For example, alliancing and partnership procurement systems are able to foster pain-gain share amongst land development parties, resulting in a win-win for all (Hosseinian & Carmichael, 2013). Finally, this study recommends enhancing project management skills by constructors to achieve successful performance and consequently owner satisfaction. This study found that challenges posed by contractors' border planning and scheduling inadequacies. Training and re-training efforts by contractors cannot be overemphasised to enhance their performance in this regard.

Despite the achievement of the current study objectives, some limitations exist, which may reduce the generalisability of the findings. The sample size is small and the spread across geographical boundaries limited. Therefore, caution will have to be applied in the assumption that the nine important challenges in land development are representative of all parts of New Zealand. Furthermore, the current datasets were generated from a disproportionate number of stakeholders, which may skew the results. Although the internal consistency of the findings was confirmed by a high Cronbach's Alpha value of 0.933. Future research investigations may wish to address the specific limitations of the current study. With revised scope, more data can be collected in future to address the limitation around low study sample. Further to this quantitative data collected for this study can be supplemented (or complemented) by more in-depth qualitative data in future studies. There are opportunities for more in-depth studies on performances within the stakeholder organisations identified in this study, and how these might contribute to improving the challenges in land development for housing provisions in New Zealand. The provision of adequate housing deserves special focus on factors constraining the land development.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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