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Towards Housing Affordability: Unpacking the influence of supply-side constraints on affordable housing delivery by private developers in Thimphu

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Summary

With continued migration Thimphu sees an acute crunch of affordable housing mostly in the form of steep rents or mortgage repayment, primarily resulting from high construction cost, high land value and high interest in housing finance (World Bank 2020). Despite not having quantitative housing gap, the middle- and low-income Thimphu residents are torn with exorbitant house related expenditure, with households paying mostly more than 30% of their income on housing in urban centers and beyond, thus reflecting an affordability gap (MoWHS 2019). The formal housing provision in Bhutan has been dominated by private sector. In Thimphu 75% of the housing stock is provided by the private developers. Therefore, private developers are one of the most important supply side actors and more crucial in the case of Thimphu.

Considering the importance of private developers in housing provision, the research tries to understand and explain the influence of supply-side constraints on affordable housing delivery by private developers in Thimphu. The research takes an explanatory and qualitative route to establish its aim through research questions which include the concepts of housing value chain of supply-side, supply-side constraints, affordable housing delivery, and developer's perception. Data was collected through semi structured interviews with 8 private developers and 2 government officials from Ministry of Works and Human Settlements and Thimphu thromde. Along with the primary data, secondary data was also collected and presented to triangulate the information collected from private developers.

The analysis of the findings indicates that the housing value of chain supply-side is weakened by land acquisition and house construction. The weaklinks of the value chain are further moderated by supplyside constraints especially the landuse and zoning regulations and building codes. Further, the physical constraints also influence the land acquisition step while at the same time influencing the landuse and zoning regulations. It was also revealed that the construction practice culture and educational background of developers had an influence on the cost of housing.

While carrying out the research, it was also learnt that the data and literature on housing for Thimphu is really poor. Thus, the research sets a starting point towards exploring important topics for housing in Thimphu including the construction practice culture on housing affordability, building codes influence on housing affordability, and detailed study of housing value chain itself. The study also recommends formalization of private developers and initiating the housing data system to understand the housing needs and trends.

Keywords

Supply-side constraints, house value chain, affordable housing delivery, private developers, development control regulations, landuse and zoning, building codes, land acquisition, house construction, Thimphu.

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Through this humble academic contribution, I would like to dedicate this research to *Thimphu city*.

Abbreviations

DHS	Department of Human Settlement, MoWHS, Bhutan
GNH	Gross National Happiness
IHS	Institute for Housing and Urban Development Studies
MoWHS	Ministry of Works and Human Settlement, Bhutan
NSB	National Statistics Bureau, Bhutan
OECD	Organisation for Economic Co-operation and Development
RGOB	Royal Government of Bhutan
UN	United Nations
UNDP	United Nations Development Programme
TSP	Thimphu Structure Plan
UV	Urban Village
HVC	Housing Value Chain of Supply-side
SSC	Supply-side Constraints
AHD	Affordable Housing Delivery
DP	Developer's Perception
MEP	Mechanical, electrical and plumbing
SoP	Standard operating procedures
RCC	Reinforced Cement Concrete
NHP	National Housing Policy
Nu	Ngultrum (Bhutanese currency)

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Chapter 1: Introduction

1.1. Background

Cities today are home to more than half the world's population offering opportunities of urban agglomeration. However, not everyone can enjoy the comfort an adequate home in these cities, so much so that 1.6 billion people live in inadequate housing and close to a billion live in slums (United Nations 2015). Globally an adequate housing is recognized as a human right, and affordability as a key element to realizing this human right. Unfortunately, almost all urbanizing cities have fallen victims to housing unaffordability leading to greater social, environmental, and economic issues. As identified by many, housing affordability is the relationship between household income and housing cost, however trends show that housing related expenses are rising faster than salary and wage increases in urban centres are widening the affordability gap (Wetzstein 2017). As a result, people resort to squatting, overcrowding, and compromise on basic necessities of daily welfare.

Unaffordability always reflects the intersection of strong demand and weak supply (Gyourko 2009). Thus, to unpack unaffordability it becomes important to understand weak links of supply side to address the gap between mismatched demand and supply. The supply side is more than just land and construction, and each step on the housing value chain of supply has a great impact on the quality and the affordability of the housing produced (Rust 2021). As much as desired, intervening in these steps of supply side is made all the more complex with planning objectives and regulations that govern the development of the city to ensure manageable growth. These regulations also trickle down to each step of housing supply in the form of zoning, landuse, building codes and infrastructure planning among many. They dictate what, where and how the housing should be built thereby increasing the complexity and lowering the affordability for supply. Glaeser & Gyourko (2003), Paciorek (2013), and a few others have noted in their studies that house prices increase in places that are tightly regulated. One easy example of regulatory impact could be that of land, where its value is determined by the kind of regulations that govern it.

As literature on market conditions and policies have shown growing interest in supply-side constraints, it would be interesting to have more discussions on the topic to render clearer insights (Katz and Rosen 1987). Also, a lot of valuable quantitative literature has been contributed to supply-side especially in relation with the volatility house prices, however not many studies have specifically covered qualitative views on the relation of supply-side constraints with the delivery of affordable housing and how it affects the supply side actors. Therefore, the study of experiences from supply-side actors on the phenomena of unaffordability needs to be brought on the table to unleash a better understanding of supply response in presence of constraints.

1.2 Problem Statement

Like all developing countries in south Asia, Bhutan a small country in size, population, and economy finds itself in no different position regarding housing affordability. Bhutan has experienced the most rapid rural urban migration in the region leading to doubling of population in Thimphu, the capital city, from 2012 -2017 (National Statistics Bureau 2017). With continued migration Thimphu sees an acute crunch of affordable housing mostly in the form of steep rents or mortgage repayment, primarily resulting from high construction cost, high land value and high interest in housing finance (World Bank 2020). Despite not having quantitative housing gap, the middle- and low-income Thimphu residents are torn with exorbitant house related expenditure, with households paying mostly more than 30% of their income on housing in urban centers and beyond, thus reflecting an affordability gap (MoWHS 2019). Therefore, it has been claimed informally that whatever is available is highly unaffordable.

The formal housing provision in Bhutan has been dominated by private sector. In Thimphu 75% of the housing stock is provided by the private developers which mostly target one or two income group thereby forcing the others out of the housing market as presented in the Habitat III report (MoWHS 2016). Penjore (2017) in his study of strengthening housing in Thimphu, had noted urban residents falling victim to private developers but more recently, newspapers have also highlighted the plight of these supply actors who are not able to deliver affordable housing along with reasons for unaffordability of their products (Kuensel 2019). Thapa (2005) in her study of rental housing in Thimphu presented that the major concern for private developers was in the slow speed of land transactions, high interest rates from the financial institutions, lack of infrastructure, and restrictions in the import of labour. These constraints have been concretized in World Bank's review which identify the key issues as land administration, planning standards and regulations, infrastructure provision, construction labor and materials (World Bank 2020). These supply-side constraints need to be studied in isolation as well in combination as some of them also depict complex relationships. The lack of an in-depth study of how the supply-side constraints hinder the housing value chain for the developers is clearly depicted in the rising unaffordability.

The problem of housing unaffordability has been well recognized in the National Housing Policy of Bhutan (2019) with the promise of achieving mass affordable housing for all. Hence, it is timely to begin academic studies on the supply-side to understand where the weaklinks lie. Private developers are one of the most important supply side actors and more crucial in the case of Thimphu. Therefore, creating an enabling environment for private developers can be a great start towards unlocking affordability. This research shall also be an addition to the very limited literature on Bhutanese housing, and on a broader level the study shall provide insights of newer context to study of supply-side constraints of housing.

1.3 Research Objectives

To understand and explain the influence of supply-side constraints on affordable housing delivery by private developers.

1.4 Research Questions

Main Question: How do the supply-side constraints influence the housing value chain towards the delivery of affordable housing by private developers in Thimphu?

Sub questions:

- What are the determinants of affordability on the housing value chain of supply-side?
- What are the common constraints faced on the housing value chain of supply-side?
- How does the housing product delivered by developers respond to affordability indicators?
- How do the private developers perceive the impact of supply-side constraints for the delivery of affordable housing?

1.5 Significance of the study/contribution

The research attempts to be of significance at context specific and broader level as follows:

- Firstly, the research topic brings a new context, that is Bhutan, in the affordable housing studies in general and specifically in supply-side of affordable housing. Bhutan has very limited academic study conducted in the field of housing till date. The housing affordability issue is however seen to be a hot topic in newspapers, policy documents and have made way in the manifesto of political parties in garnering votes more recently. Thus, the research can serve as a contribution to budding literature on Bhutanese housing and contribute a new contextual insight to the supply-side study of affordable housing.
- Secondly, the research can contribute to the limited qualitative analysis on the effect of supply-side constraints on affordable housing delivery. Most state-of-the-art knowledge give us valuable quantitative findings of supply-side constraints especially in relation with the volatility house prices, however not many studies have specifically covered qualitative views on the relation of supply-side constraints with the delivery of affordable housing and how it affects the supply- side actors.
- Finally, the research can be of significance for policy makers to consider for Thimphu as Bhutan has a new National Housing Policy 2019 which aims to have mass affordable housing. The strategies and implementation plan for the policy are currently being conceptualized.

Chapter 2: Theory Review

This chapter shall bring forward the literature on the main concepts of the research. It will first begin by introducing the concept of housing affordability followed by understanding the housing value chain of supply-side. Subsequently, an extensive understanding of the nuances of supply-side constraints is presented with evidence from literature on how it possibly impacts the steps in housing value chain, and housing affordability. The chapter will also synthesize the components of supply-side constraints into different categories to have a clear understanding of its mechanism in affecting housing affordability through the value chain. A small section on housing developers is also covered to contextualize the unit of study. Finally, the ideas presented in the review are illustrated in the form of a conceptual framework.

2.1 Housing Affordability

Housing affordability is recognized as the relation between people and housing as it reflects the ability/desire of the people to pay for the housing service (Stone 2006a). The easy measure given by many scholars say that the housing cost should not exceed 20-30% of household's income for housing to be affordable (Ayala, Eerd, and Geurts 2019). Affordable housing is also broadly defined as housing of adequate quality and location, and one that does not cost so much that it restrains its occupants from meeting other basic living costs or risks the realization of their right to adequate housing (OHCHR 2016). To simply put it, housing affordability is the ability to meet housing costs without compromising on non-housing necessities (Grigsby and Rosenberg 1975). Some examples of non-housing expenditure include food, transportation to work, health and childcare expenditures, and savings for emergencies, retirement, and higher education, etc.

The definition gives an idea of the trade-offs that are associated while deciding for housing service (Malpass 1993). It can be noted that the critical elements of affordability are household income, non-housing expenditure and housing cost. While these elements mostly are demand-side determinants of affordability, the supply-side determinants of affordability do not receive as much attention. The determinants on the supply-side include availability of land, land development policies and process, infrastructure cost, construction cost, and property taxes among many (Karamujic 2015). These determinants are not only part of important steps of housing value chain but are also governed by several planning and regulatory tools (Glaeser and Gyourko 2003; Hilber and Vermeulen 2016; Katz and Rosen 1987). To bring in more focus on supply-side, the following section shall introduce the steps involved in the housing value chain of supply-side. Understanding the value chain can help detect the weak links that are affected by various constraining factors which eventually undermine affordability (W.E.Forum 2019).

2.2 Housing value chain of Supply-side

The concept of value chain was first explained by Michael Porter in his 1985 best seller, *Competitive Advantage: Creating and Sustaining Superior Performance* (PORTER'S 1985). It started as a model for business management in which the value chain was described as a chain of activities leading to the final product. The term 'value' implies the value gained by the product in each step/activity in the chain. The value chains are used to increase efficiency of business to offer customers value added products at lower costs. Identifying importance and issues of each step in the value chain can help improve the quality and cost of the final product (Luenendonk 2019). Similarly, the use of value chain for delivery of housing as a durable good can be significant in distinguishing the steps involved in housing supply. Studying the value

chain of supply-side can help identify the weak-links and help strategize interventions accordingly.

Although in a nascent stage, the use of value chain of supply-side is seen to be prevalent in several international forums, workshops, and context specific projects with the objective of addressing affordability (Ferguson 2008; Houston 2010; Smith 2015; W.E.Forum 2019). The housing value chain can be divided into supply value chain, and demand value chain. The value chain of demand side usually routes from “needs to loans” in order access homes to live. It involves processes of eligibility criteria, evaluating purchase model (rent or own) and access to credit. However, for the relevancy of the research, focus will only be on the value chain of supply-side. Each step in the value chain represents a set of activities that culminate in achieving a significant milestone in the process of delivering affordable housing (Ferguson 2008). The world economic forum (2019) report presents the housing value chain of supply-side as a four-step process of building homes to live. These processes include land acquisition and securing title, land-use, funding affordable housing, and housing design and development costs (W.E.Forum 2019). Another presentation by David Smith (2015) describes the value chain as a process of turning an unbuilt place into occupiable homes, a process of turning land to home. He identifies three main activities in the chain which are, planning the property development, taking risks of moving ideas into expenditure (design to construction), and finally exit by selling it to customer. Ferguson (2010) and Houston (2010) drafted the steps for supply-side value chain around steps involving land, infrastructure, construction, and community institutions. It can be observed that except for World economic forum (2019), the rest of the value chain proposals do not include landuse regulations as a step in the chain. It can be understood that these factors like landuse regulations are exogenous to the value chain and thus, have a moderating effect on the process of housing delivery. *Table 1* shows the steps of supply-side value chain as provided by different authors:

(Ferguson 2008)	(Houston 2010)	(Smith 2015)	World economic forum (2019)
<ol style="list-style-type: none"> 1. Land assembly/acquisition 2. Tenure/title 3. Bulk infrastructure 4. House construction 5. Sales, transfer rental 6. Maintenance and on-going improvement 7. Social and economic infrastructure 	<ol style="list-style-type: none"> 1. Acquisition and occupancy of land 2. Upgrading property tenure 3. Provision of basic infrastructure 4. Construction of house 5. Building community institutions 	<ol style="list-style-type: none"> 1. Planning property development <ul style="list-style-type: none"> - Land - Trunk infrastructure - Site layout - Home design 2. Risk of moving ideas to expenditure <ul style="list-style-type: none"> - Risk assumption (money) - construction 3. Exit by selling it to customer <ul style="list-style-type: none"> - offtake 	<ol style="list-style-type: none"> 1. Land acquisition and securing title 2. Land-use <ul style="list-style-type: none"> - zoning and regulation 3. Funding affordable housing 4. Housing design and development costs <ul style="list-style-type: none"> - urban infrastructure - land - construction

Table 1: Housing value chain of supply-side

Source: Author (2021)

For this research, the steps for supply-side value chain will only focus on the basic steps needed to produce housing. Taken as a culmination of the information from previous studies, the focus

will be on land, house construction and basic infrastructure provision. These are the most important elements requiring maximum finance and without which the housing value chain of supply-side is incomplete (Ferguson 2008; Houston 2010). The steps and sub-steps of the value chain identified for the research presented below in *figure 1*:

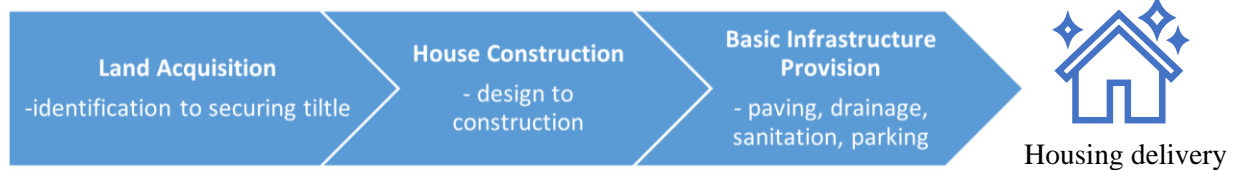


Figure 1: Housing value chain adopted for research

Source: Author (2021)

Having looked into the processes necessary for affordable housing delivery, the next section will cover the literature on supply side constraints to further unpack its components. Subsequently, the influence of supply-side constraints on housing affordability will be presented.

2.3 Supply-side constraints

The supply-side of housing is the part dealing with the production and provision of housing. Like any other economic good, housing supply is influenced by demand, which in itself is influenced by affordability – ability or willingness to pay or invest in the housing product. Although demand is constrained by affordability to great extent, the supply-side is also seen to deliver products that are too expensive for demand side to further afford (Maclennan 2012). As explained by Bertaud (1994, 2004), high house prices are the weakness of supply-side. Along with many other factors, macroeconomic environment and security of property rights are mostly observed to play a major role in defining the risks of housing supply (Bertaud 2004; Bertaud and Renaud 1994). Under the influence of such constraining factors, housing supply is only ensured when the market value of the housing product is greater than the costs of housing delivery. These factors determine not only the quantity of housing supplied but also for whom and where it is supplied. Thus, the supply-side constraints need to be understood as combination of factors that not only limit the supply of housing to a particular group (mostly higher-income group) but also makes the products highly unaffordable for the low-income group.

2.3.1 State-of-the-art on housing supply literature

For a long time, the demand side study had always superseded the supply-side study of housing. It was mostly attributed to the lack of interest, data, and difficulties in modelling housing supply (Gyourko 2009). With elevated interest in market dynamics, the gap has narrowed to a great extent even though most valuable context of study are always from bigger economies of the west including US and UK. More recent studies from the global south have also emerged from the context of India, China, Africa and Malaysia (Dong 2016; Mohd Thas Thaker and Ariff 2020; Mukhtar, Amirudin, and Mohamad 2016; Patel, Byahut, and Bhatha 2018). This research develops around closely similar theme as the Malaysian case by Mohd Thas Thaker and Ariff (2020), which gives a perspective of small-scale developers who find it difficult to offer low-cost units for middle- and low-income earners due to land shortages, land prices and bank approval.

Amongst these, many important contributions have been made to examine the impact of regulations on supply, which further has an impact on house prices (Aura and Davidoff 2008; Galster 1997; Glaeser and Gyourko 2003; Gyourko 2009; Gyourko and Molloy 2015; Hilber and Vermeulen 2016; Paciorek 2013). Glaeser & Gyourko's (2003) work on the impact of building restrictions on housing affordability remains the most valuable reference point for most research looking into the relationship of regulations, house prices, and supply. They brought the focus on why housing prices are so much higher than the actual cost of construction. While trying to address the gap between housing costs and the actual construction cost, their findings come to conclude that whole of America does not face affordable housing crisis but only few places which are governed by stringent zoning and land use control. Similar relationship between landuse control and house prices is demonstrated in the case of California by Quigley & Raphael (2006). Paciorek (2013) also identifies regulations and geographic constraints as critical and complementary elements that limit the supply responsiveness. Hilber & Vermeulen (2016) make a similar finding on the effect of regulations and physical constraints by zooming particularly into the impact of local supply constraints on house prices in England.

The findings initiated by Glaeser and Gyourko (2003) depicting the inverse relationship of regulations and house prices have been well strengthened by others with a common mention of factors like landuse, zoning, and physical features that affect the house prices making it unaffordable. Hilber and Vermeulen (2016) take a step further in categorizing the supply-side factors into regulatory and physical constraints. It can be deduced that existing body of literature have a consensus that the supply-side side constraints especially regulatory and physical/geographical constraints increase the house prices thereby limiting supply. However, the studies have not dwelled deeper into completely unpacking the impact of supply-side constraints at each step of housing value chain. From land acquisition to sale or transfer of the housing product, it is crucial to understand how affordability is affected in each step to formulate strategies (Rust 2021).

For the purpose of this research, planning (zoning, land-use, and infrastructure provision) and regulatory constraints (building codes, and construction material and labour) shall be collectively grouped under the term development control regulations as both are tools for managing growth. The physical constraint shall be confined to the amount of land that is undevelopable due to natural topography. Therefore, supply-side constraints shall be defined as a combination of development control regulations, and physical constraints which influence housing delivery and lower housing affordability. These individual components shall be discussed in detail below.

2.3.2 Components of Supply side constraints

From the debates on existing body of literature on supply-side constraints, there has been recurring validation of a few components of supply-side as constraining affordable housing delivery. These components are as follows:

2.3.2.1 Development control regulations

These are set of rules that are planned to ensure proper and effective development of city as well as general welfare of the public (Singh 2020). Its main objective is to control development and use of land. As a result, the formal housing supply is determined by compliance to a variety of regulations, including land ownership and land title, conversion of agricultural land to urban use, land-use zoning for residential use, layout and subdivision regulations, site planning regulations such as minimum lot size, ground coverage, setbacks, density, floor space index

and parking, and building and construction standards (Patel and Phatak 2014). Development control regulations can be further branched into planning and regulatory categories.

a) Planning

The aspect of planning has been adopted for over decades to ensure safety, environmental goals, and aesthetics. Planning can be described as a process of developing cities by defining the use of every possible element including land, air, water, built environment, transportation, economic and social functions (Kitchin and Thrift 2009). According to Katz and Rosen (1987), it includes a range of interdependent decisions within the public and private spheres that decide and shape the future of cities in terms of landuse, built environment, and infrastructure investments. Encompassing various elements for city's manageable growth, planning comprises multiple approaches like transportation planning, environmental planning, economic plans, etc. Housing affordability being the focus of the research, the investigation will be narrowed to components of planning which impact house prices. As per literature the common planning constraints for housing affordability include zoning, landuse and infrastructure provision (Glaeser and Gyourko 2005; Hilber and Vermeulen 2016).

Zoning divides mass of land into different zones each of which is assigned a particular purpose like residential, industrial, or green zone for instance. These zones are governed with landuse regulations which decides the size, location, density, and function of buildings proposed on the particular land (Whitnall 1931). Therefore, zoning and landuse are closely related, and directly associated with property and developmental rights. Together, zoning and landuse directly impact the value of land not only with its location/zone but also with the kind of development rights associated with it. For instance, growth control study in San Francisco Bay Area indicated that zoning and land-use regulations appear to have had a substantial effect on house prices (Katz and Rosen 1987). The house prices were 17 to 38 percent higher in those communities in which these landuse control were present. Besides zoning and landuse, infrastructure provision is an important feature of planning and plays a big role especially in defining affordability since it enables livelihood cycle (Jayantha Perera 2014). Infrastructure provision for housing include basic social and physical infrastructures, and its further connection to bulk infrastructure.

Traditionally, planning decisions have mostly followed top-down approaches with master planning of human settlements (Taylor 1999). It is often argued that presence of collaboration and coproduction in planning processes which involve diverse stakeholders can potentially yield better results despite its complexities (Wolfram 2018).

b) Regulatory

Regulatory constraints are a set of standard regulations to be complied with, and one which affects the process and typology of housing delivery (Alastair McFarlane 2021). Right from design and construction to delivery of housing, the housing value chain must conform to various building regulations. These regulations comprise of firstly, the various approvals required at different stages of house construction, and secondly, the building codes that the structure must comply with. Some common steps include getting planning permit as an initial step, followed by building permit to start construction and finally occupancy permit as a final step (Listokin and Hattis 2005). Acquiring these permits involve abiding by the building codes and standards as specified by the jurisdiction under which the proposal falls under. All these steps are basically to ensure public safety, health, and wellbeing through resilient habitable structures. Typical examples of building code components include codes for structural integrity, mechanical integrity, fire safety, energy efficiency, etc. However, while framing codes for quality constructions, authorities are observed to give minimal consideration to the

financial impact of the codes, and similarly the household income is least considered while formulating the codes (Patel et al. 2018). Therefore, many have quoted mandatory building codes and approval procedure as key regulatory constraints to housing affordability (Alastair McFarlane 2021; Glaeser and Gyourko 2005; Patel et al. 2018). Lags in issuance of permits were noted to increase house price and reduce construction of new residential units. In a study of Ahmedabad, it was inferred that relaxing few mandatory building and site planning regulations can reduce housing cost by 34% and increase supply by 75% without lowering quality and safety (Patel et al. 2018). Interestingly, an older study by Listokin and Hattis (2005) revealed that building codes impact affordability only up to 5% or less. However, most studies, old and new, analyse that the cost of structural material and labour can be increased by building codes that require major changes in the building design. Moreover, substantial carrying costs can be imposed by administrative delays and by often lengthy intervals required to gain development approval (Glaeser and Gyourko 2005; Katz and Rosen 1987; Patel et al. 2018).

2.3.2.2 Physical Constraints

Physical constraints essentially are identified as geographical conditions of the context, which due to its nature or form renders land as undevelopable for housing. These geographic features can be either oceans, lakes, mountains, or wetlands. Initial study carried out by Albert (2010) highlighted that residential development is effectively curtailed by the presence of steep-sloped terrain in the US. Geography is shown to be one of the most important determinants of housing supply as it directly impacts affordability via reductions in the amount of land availability, and indirectly, via increased land values and higher incentives for antigrowth regulations. He therefore concluded that most areas with issues of housing supply are severely land-constrained due to its physical limitations. Another influential work on physical constraints is by Dong (2016) on the study of housing market in China. The findings are in secondment with former's work by implying that cities with less naturally available land experience greater appreciation of house prices and poor response of supply-side. The naturally available land referred to as the one which is safe for construction with acceptable slope and soil conditions. Dong (2016) argues that once there is less naturally available land due to physical constraints, it forces the government to tighten its regulations on available land thereby appreciating the prices. However, influential works by Glaeser and Gyourko (2003) and Hilber and Vermeulen (2016) show that physical constraints have little effect on housing affordability but have complementary impacts to development control regulations.

From the housing supply-side literature, supply side constraints are concluded as development control regulations and physical constraints. The section below will further provide a brief context of the housing developers in Thimphu to contextualize the focus of the research.

2.4 Housing Developers

Housing development is a commercial enterprise that is profit driven and highly speculative. The primary activity is investing in land and/or buildings and subsequently improving them, typically through the construction of new buildings or the provision of infrastructure and services (Amann and Mundt 2012). A 'housing developer' therefore is an actor or entity whose main activity is the facilitation of housing development. They modify the physical environment for the purpose of their own economic gain (Acioly and French 2012). These developers can be one person, a group of people, or a partnership or corporation. Housing developers usually buy the necessary land, coordinate, and supervise the planning and building process, arrange for adequate financing, and deliver dwelling units on the market. Developers around the world comprise of both formal and informal, as well as public and private actors.

In case of Thimphu in Bhutan, there are only a few formal real estate developers catering mostly to higher income; however, there are more private individual developers who own one or more apartment buildings, and provide 75% of housing in Thimphu mostly in the form of rental homes (NSB 2018; Thapa 2005; World Bank 2020). More recently, selling out of these apartment units has also become a popular practice among the small-scale private developers. With no organized or long-term plan for housing development finance, these developers fail to capitalize either on the advantage of mass construction or skills development (MoWHS 2020). They also avail housing loans at commercial rates of interest. Typically, interest rates range between 8 and 13 percent for a maximum period of 10-20 years, which is rather high (World Bank 2020). Consequently, the housing cost, rental and ownership, are both high. Despite the lack of information about these private developers, many have cited high lending cost as a driver of unaffordability in national newspapers (Kuensel 2019). This research shall focus on both budding real estate and small-scale private developers to understand the challenges and practices.

With very limited and inconsistent data on Bhutanese housing market, it becomes difficult to note the challenges faced by the developers in depth. However, the National Housing Policy of Bhutan (2019) gives a basis for further scrutiny as it identifies land acquisition and high construction finance as major issues. To further lay a better groundwork it would be beneficial to take examples from other countries. Tan, Samihah, and Phang (2017) have presented in detail the challenges faced in affordable housing delivery by Malaysian developers. They categorize the challenges as economic challenges (land cost, shortage of construction workers, compliance cost, and goods and service tax) and institutional challenges (bureaucratic process, inefficient affordable housing delivery system). Interestingly, they also note that there is a lack of clear definition of affordable house. Therefore, developers determine affordability themselves creating nonuniform understanding of what affordability actually is (Tan, Samihah, and Phang 2017). Similarly, others have also identified shortage of finance, land governance, infrastructure, building construction, and inadequate housing policies as primary areas of concern for housing developers (Gopalan and Venkataraman 2015; Rust 2018). Further, the challenges of affordable housing delivery for these developers are presented below in the form of a conceptual framework based on the literature discussed above.

2.5 Conceptual framework

Figure 2 below shows the conceptual framework for the study. It explains how the housing value chain of supply-side under the moderating effect of supply-side constraints affects housing affordability for developers. The independent variable here is the value chain of supply-side which works in a series of steps to produce housing. The three most basic and important steps in the value chain which are governed by several regulations and requires most finance is taken into consideration for developing the framework. These steps or variables are land, basic infrastructure provision, and house construction.

The dependent variable is affordable housing delivery. The value chain works towards producing housing, but whether the housing product is affordable or not shall depend on the influence of moderating variable, which is the supply-side constraints. As per findings from the literature, the most common supply side constraints can be categorized into two variables, development control regulations, and physical constraints (Glaeser & Gyourko, 2003; Hilber & Vermeulen, 2016; Paciorek, 2013). The development control regulations further encompass planning and regulatory constraints. Planning constraints comprise of infrastructure provision, landuse planning, and zoning, while regulatory constraints include building regulations and

standards for construction materials. As for physical constraints, it mainly tells us about the amount of undevelopable land because of natural topography and geographical features.

The steps in the value chain are influenced by the variables of supply-side constraints which further affects the affordable housing delivery. Most findings from literature direct towards the fact that supply-side constraints have a negative effect on house prices and housing affordability; however, each constraint affects the housing affordability differently. Under the development control regulations, planning has most evidence of having a greater impact on housing affordability followed by regulatory constraints and the least effect is contributed by the physical constraints (Hilber & Vermeulen, 2016; Paciorek, 2013).

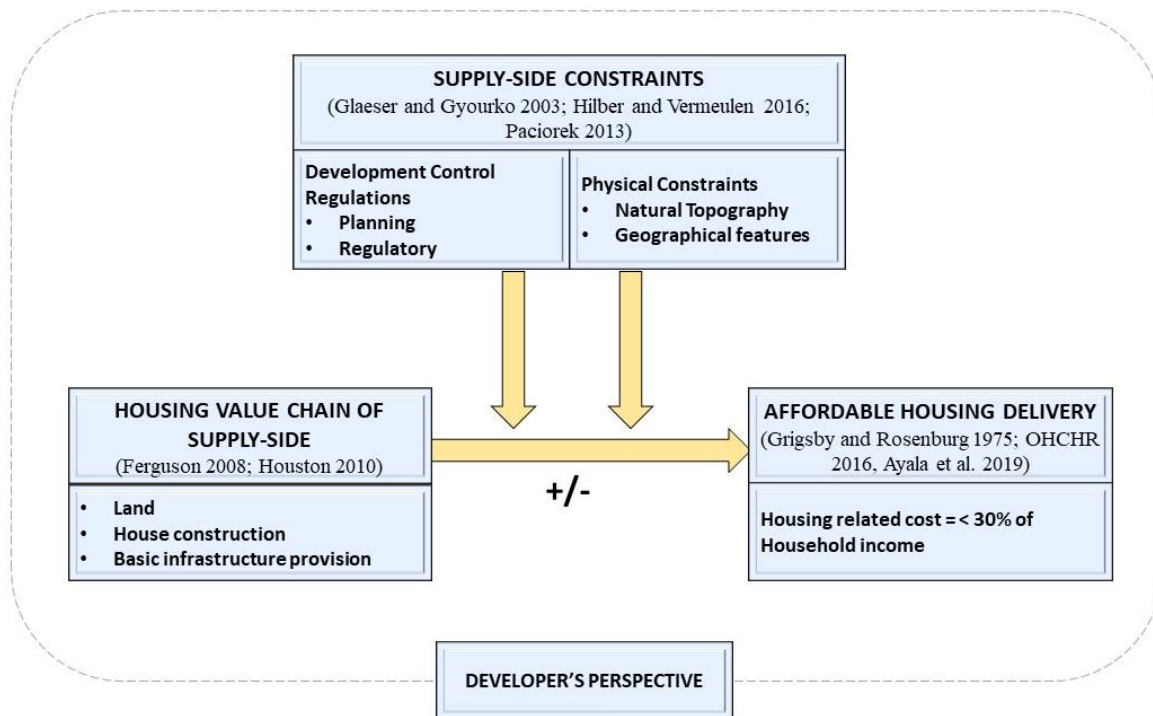


Figure 2: Conceptual framework
Source: Author (2021)

The process of housing delivery involves huge money and requires numerous approvals from the government thereby creating opportunity for corrupt practices (Fazekas 2017). This brings in the question of red tape or burdensome regulation which has always been identified as root of corruption. Although not covered in this research, it would be beneficial to consider the role of corrupt practices on supply-side for future research to strengthen supply-side studies.

Chapter 3: Research Design and Methods

The proposed research shall be explanatory and qualitative in nature. The details of research design and methods used to ascertain its research objective and questions are laid out in this chapter. The conceptual framework as derived from literature review in chapter 2 has been operationalized into measurable indicators for further analysis. Following this, suitable research strategy, sample size and selection, and data collection methods have been coherently adopted and detailed to allow transparency in the methodology adopted. Finally, the chapter presents its expected challenges and limitations, and the reliability and validity.

3.1. Operationalization

Operationalization is an important step involving the transformation of theory into measurable entities (Van Thiel 2014). In line with the conceptual framework derived from literature, the following sections will operationalize the main concepts. These concepts are housing value chain of supply-side (HVC), supply-side constraints (SSC) and affordable housing delivery (AHD). Additionally, private developer's perception (DP) of supply-side constraints will also be operationalized considering the research's focus on private developers.

3.1.1. Operational Definition of Variables

Value chain of Supply Side: It is a three-step chain of activities, each of which culminate in achieving a significant milestone in the process of affordable housing delivery (Ferguson 2008; Houston 2010). The three main steps in the chain are:

- **Land Acquisition:**

It involves the identifying and acquiring of land in suitable location with preferable developmental rights. The process ends in securing title for the purpose of housing development (Ferguson 2008; Houston 2010).

- **House Construction**

It includes activities starting from designing and drafting house plans, making cost plans, sourcing materials, and constructing it for occupancy (Houston 2010). The process of house construction activities also requires several clearances, permits, approvals, and compliance checks, the variability of which has substantial impact on affordability.

- **Basic infrastructure provision**

This step includes the activities for the installation of basic infrastructure including connection to bulk and local services (Houston 2010). The basic infrastructure provision for housing includes paving, drainage, parking, sanitation, sometimes retaining walls (considering the mountainous terrain of Thimphu), access to transport, and parking facilities.

Table 2 below contains the operationalization of HVC showing concept, variable, indicators, and method and sources of data collection.

Sub Question 1	Concept	Variable	Indicators	Methods	Source of Information
What are the determinants of affordability on the supply-side value chain of housing?	Housing value chain of Supply-side	Land Acquisition	Minimum timeframe for land identification	Semi structured interview	Private Developers
			Minimum timeframe for land acquisition	Secondary data	National Land Commission of Bhutan website
				Semi structured interview	Private Developers

			Land acquisition cost relative to total cost of housing provision	Semi structured interview	Private Developers
		House Construction			
		- Design	Number of approvals required for house construction	Secondary data	Websites of Thimphu thromde (Municipality) and Ministry of Works and Human Settlement (MoWHS)
			Minimum time required for mandatory approvals before house construction	Semi structured interview	Private Developers, Content Analysis
		- Construction	Accessibility of bank loans for housing construction	Secondary data	Bank websites
			Amount of construction material import	Semi structured interview	Private Developers
			Amount of construction labour import		
		Basic Infrastructure Provision (Paving, Drainage, Parking, Sanitation)	Minimum timeframe for basic infrastructure provision	Semi structured interview	Private Developers
			Cost of basic infrastructure provision relative to the total cost of housing provision	Semi structured interview	Private Developers
			Share of cost borne by government	Semi structured interview	Private Developers

Table 2: Operationalization of housing value chain of supply-side

Source: Author (2021)

Supply-side Constraints: These are a combination of development control regulations, and physical constraints of a context which influence housing delivery and lower housing affordability (Glaeser and Gyourko 2003; Hilber and Vermeulen 2016; Paciorek 2013).

- Development Control Regulations: These are set of rules that are planned to ensure proper and effective development of city as well as general welfare of the public (Singh 2020). Its main objective lies in controlling development and use of land.
 - Planning: It is an important aspect of development control regulations including a range of interdependent decisions within the public and private spheres that shape the future of cities with the use of tools like landuse, zoning, and bulk infrastructure provision (Hilber and Vermeulen 2016; Katz and Rosen 1987).
 - Regulatory: Regulatory constraints are set of standard regulations to be complied with which affect the process and typology of housing that is delivered. For housing, these regulations come in the form of building codes, building permits and construction compliance (Glaeser and Gyourko 2005; Patel et al. 2018).
- Physical Constraints: Physical constraints essentially are identified as geographical conditions of the context which due its nature or form renders land as undevelopable for

housing. These geographic features can be either oceans, lakes, mountains, or wetlands (Dong 2016).

Table 3 below contains the operationalization of SSC showing concept, variable, indicators, and method and sources of data collection.

Sub Question 2	Concept	Variable	Indicators	Methods	Source of Information	
What are the common constraints faced on the supply-side value chain of housing?	Supply-side Constraints	1. Development Control Regulations				
		• Planning				
		•Zoning and Landuse	Types of landuse incentives available	Secondary data	Development control regulations 2016, National Housing Policy of Bhutan 2019, Landuse and zoning plan for Thimphu (MoWHS)	
				Semi structured interview	Urban Planners (Department of Human Settlement (DHS), MoWHS)	
			Level of knowledge of landuse regulations	Semi structured interview	Private Developers	
			Level of knowledge of zoning regulations	Semi structured interview	Private Developers	
			Number of participations in formulation of regulations	Semi structured interview	Private Developers	
		• Bulk Infrastructure Provision	Availability of connection to main transportation network	Semi structured interview	Private Developers, Urban Planners	
			Availability of connection to main sewer line	Semi structured interview	Private Developers, Urban Planners	
			Level of cost implication in absence of bulk infrastructure	Semi structured interview	Private Developers	
		• Regulatory				
		•Building Code	Level of flexibility in structural standards	Content Analysis and semi structured interviews	Bhutan Building Regulations 2018, Building code of Bhutan 2018, Development control regulations 2016, Government officials, Private developers	
			Level of flexibility in architectural standards			
			Level of flexibility in mechanical, electrical and plumbing (MEP) standards			
			Level of knowledge on building code requirements	Semi Structured interview	Private Developers	
Level of relevancy of building codes to context						
Level of affordability considerations in building codes						

		2. Physical Constraints			
	•Topography	Amount of land with slope above 30%	Secondary data	Maps from DHS, MoWHS	
		Amount of land in environmental and green zones	Secondary data	Maps from DHS, MoWHS	

Table 3: Operationalization of supply-side constraints

Source: Author (2021)

Affordable Housing Delivery: Affordable housing delivery is the supply of housing, the cost of which does not restrain its occupants from meeting other basic living costs or risk the realization of right to adequate housing (OHCHR 2016). In simple terms, it is the supply that enables the households to meet housing costs within 30% of the household income (Grigsby and Rosenberg 1975; Ayala et al. 2019).

Table 4 below contains the operationalization of AHD showing concept, variable, indicators, and method and sources of data collection.

Sub Question 3	Concept	Variable	Indicators	Methods	Source of Information
How does the housing product delivered by developers respond to affordability indicators?	Affordable Housing Delivery	Income Expenditure	Proportion of income spent on housing	Secondary data, semi structured interview	National Survey documents, private developers
		Housing Stock	Percentage of affordable housing stock available		
			Cost of housing units		

Table 4: Operationalization of Affordable Housing

Source: Author (2021)

Developer's Perception: The developer's perception will include the perception private developers on the profitability of affordable housing delivery. It also includes the developer's acceptability of supply-side situation which is explored through satisfaction level and willingness to supply affordable housing.

Table 5 below contains the operationalization of DP showing concept, variable, indicators, and method and sources of data collection.

Sub Question 4	Concept	Variable	Indicators	Methods	Source of Information
How do the private developers perceive the impact of supply-side constraints for the delivery of affordable housing?	Developer's Perception	Profitability	Number of years taken to liquidate loans	Semi structured interview	Private developers
			Minimum time frame for selling/renting out of units		
		Acceptability	Level of satisfaction with development control regulations		
			Degree of enabling environment for affordable housing delivery		

			Willingness to supply affordable housing		
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Table 5: Operationalization of Developer’s Perception

Source: Author (2021)

3.2. Research strategy

The choice of research strategy is the central element of research design as it directs the overall logical procedure that needs to be followed while carrying out the research (Van Thiel, 2014). While the choice of research strategy is solely governed by the objective and questions, it also is influenced by the kind and amount of data that is available for the research problem at hand. The research objective here attempts to unpack supply-side constraints to understand how it influences the delivery of affordable housing by private developers in Thimphu, Bhutan. The objective gives clear information on the small number of research units. This makes the application of survey and experiment strategies unlikely. Also, with minimal previous study and literature available on the context of study, desktop research also becomes a difficult strategy.

To realize this objective, which consist of a subject of study in a specific context, the strategy of case study becomes most suitable (Van Thiel, 2014). Therefore, strategy of case study shall be adopted to present detailed and intensive analysis of the complex problem of supply-side constraints on housing affordability in Thimphu city. As every context entails its own unique characteristics, case study as put forward by Van Thiel (2014) shall help to render richly detailed descriptions and explanations to the questions, which in this case is specific to the difficulties in affordable housing delivery faced by private developers of Thimphu.

3.3. Sample size and Selection

Generally, sampling branches out into probability and non-probability sampling. Probability sampling comes handy when there is large number of units of study, and so the samples are randomly selected. In contrast, non-probability sampling is used when the unit of study is limited, and consequently, samples are deliberately selected keeping the research’s requirement (Van Thiel 2014). The sample selection for this research shall be of non-probability type since the unit of study is limited, specific to few private developers and government officials. From various non-probability methods, purposive sampling becomes the best fit sampling method as the nature of research is a qualitative one, focussing on semi structured interviews to gain in depth perspectives from private developers. Such sampling essentially deals with the selection of units (private developers, government officials), with direct reference to the research questions being asked (Bryman 2016).

The research objective and questions are themed on the supply-side of housing with a focus on the constraints faced by the private developers. The supply-side also has housing value chain as an important step towards housing delivery, and the role of government is integral in the value chain to create an enabling environment for the private developers. Therefore, to answer the research questions, sample selection includes selective private developers and government officials. The selection of private developers was predominantly small-scale developers as they provide most 75% of housing in Thimphu. The sample will includes a few formal real estate developers to triangulate perceptions. Selection was entirely based on the availability and voluntary participation given the time limitation of research, coupled with restrictions of CoVID-19 pandemic. About the selection of government officials, Sr. Urban Economist involved in housing policy making was selected from the Ministry of Works and Human Settlement (MoWHS) in Thimphu, Bhutan. The Urban Economist from MoWHS was very

important to the research as the agency leads the formulation of National Housing policies, development control regulations, and policies for construction industry (MoWHS 2021). Additionally, structural engineer from Thimphu Thromde (Municipality) was important respondent for the research considering their position as approving authority for construction compliance in Thimphu.

3.4. Data Collection Method

The data collection includes both primary and secondary data collection. Considering the limited academic literature available for the context, research primarily focusses on qualitative data to be collected through semi-structured interviews. Secondary data in the form of policy documents were also important source of data to help understand the current situation specific to Thimphu. Secondary data includes prevalent zoning and landuse plans, building code and regulations, development control regulations, land act, national housing policies, National survey reports, and websites of government and financial institutions. Quite often there occurs ad hoc changes in regulations that come in the form of either circulars or executive orders, and these are not immediately updated in the regulations that are published. In such case, in depth interview becomes necessary to dig in valuable information on various tools available. Therefore, detailed semi-structured interviews from private developers (Annex 1: Interview guide for private developers) as well as urban professionals from MoWHS (Annex 2: Interview guide for urban economist), and Thimphu Thromde (Annex 3: Interview guide for structural engineer) were carried out. Both private developers and urban professionals were interviewed on questions themed around the key concepts. However, the questions were adapted to their area of concern.

To analyze the information from the semi structured interviews, Atlas-ti was used. Data from the field will be transcribed and uploaded in separate files of Atlas-ti. The researcher maintained ethical principles in every cycle of research to ensure the wellbeing of participants. As indicated by Bryman (2014), participants were explained and given enough information explaining purpose and processing of data along with interview consent form to ensure informed consent for participation in semi-structured interviews.

3.5. Challenges and Limitations

The challenge for this research mostly remains in the data collection part. The context of the research is Thimphu city from where the data was to be collected. Given the time limitations coupled with CoVID-19 travel restrictions, it was not possible to go to field for data collection. Moreover, it was also difficult to get in touch with private developers since many of them function informally, thus making the tracing of private developers difficult. All data, both secondary and primary were to be collected online through telephonic conversations, emails, zoom meetings, etc. Conducting semi structured interview completely online sometimes risk and disrupt the spontaneity of the conversations through technical glitches. Therefore, the quality of answer being delivered by the participant might have been hampered to some extent.

3.6. Reliability and Validity

The reliability of the findings depends on the accuracy and the consistency of the variables. The accuracy can be realized by identifying variables that are precise and correct to answer the research questions. Although consistency is harder to achieve, it was ensured through

triangulation method of data collection, and piloting of questionnaires and interviews (Van Thiel, 2014). The research also has its methodology and process of data collection fully recorded and reported to ensure greater reliability.

Generally, case study research reflects high internal validity and low external validity (Van Thiel, 2014). Same is the case with this research which ensures high internal validity through adequate operationalization of concepts into variable and indicators as per theory. Internal validity is further ensured through adoption of triangulation of data collection involving mix of secondary data, and semi structured interviews from private developers and government officials. In terms of external validity which talks of generalization of findings, the findings will be difficult to be applied to other cities. Firstly, the results from the sample consisting of a small mixed group of private developers may not be representative of a larger group. Secondly, the supply-side constraints will differ context wise both in terms of development control regulations and physical constraints. Moreover, the housing value chain of supply-side may also have additional or lesser steps depending on the requirements of a particular context. Therefore, this research will have lower external validity.

Chapter 4: Research Findings

The chapter includes research findings and analysis as derived from the semi structured interviews (private developers and government officials) and secondary data. The chapter first begins by building a brief policy context to understand the environment that governs the housing dynamics for the private developers, be it in the aspect of housing value chain or the supply side constraints. It also provides the profile of private developers who were the primary source of data collection. It then provides individual data findings per concept along with interpretation of the findings.

3.1 Policy Environment

To understand how the housing value chain for the developers is influenced by the supply-side constraints, it becomes important to understand the policy context of the city. Thimphu's development is guided the Thimphu structure plan (TSP) 2002-2027 and administered by Thimphu Thromde (local municipality). TSP is the mother document based on the principles of which all other development regulations for Thimphu have been formulated. One important regulatory document framed keeping the TSP in its essence is the Development Control Regulations (DCR). It is an important part of the structure plan and gives clear-cut guideline for its management. DCR particularly lays down permissible land uses, the size and height of structures for each zone, in order to manage urban form (Adhikari 2003). The development control regulations 2016 is the latest document to be referred by anybody intending to build or review the building proposals. The development control regulations also mandate the use of other regulations like the Bhutan Building Regulations 2018, which mainly aims to facilitate and regulate safe building construction to promote healthy living environment. As a part BBR, there are other supporting documents like the building code of Bhutan 2018, and Bhutanese architectural guidelines 2015 which need to be complied with in buildings.

Regarding policies and regulations for housing in particular, the implementation and compliance monitoring part remains with the Thromde while the policy formulation is mostly spearheaded by MoWHS. Except for DCR which is produced by Thromde, the housing policies are prepared at National level by the MoWHS in collaboration with relevant stakeholders. In 2002, MoWHS came National Housing Policy with the objective of providing “*safe, basic and affordable housing, promote homeownership and create a transparent and well-functioning housing market.*” However, the policy does not clearly establish definitions of affordability or need, especially for low income or vulnerable groups nor did it have any supporting strategy documents (World Bank 2020). The 2019 Revised National Housing Policy identifies *affordability and homeownership* as key goals. The policy recognizes the importance of housing and the dire need of addressing increasing unaffordability, and supply constraints. However, with the policy being new, it does not have its supporting implementation plans and supporting strategy documents ready. The following *table 6* lists out the important policy and regulatory documents which are important for the house value chain as it defines the way a housing should or should not be developed.

Document Name	Previous version	Current version
Bhutan Building Regulations (BBR)	2002	2018
Thimphu structure plan (TSP)	-	2002-2025
Bhutanese architectural guidelines (BAG)	2001	2015

Building Codes of Bhutan (BCB)	-	2018
National Housing policy of Bhutan (NHPB)	2002	2019
National Human Settlement Policy (NHSP)	-	2019
Development Control Regulations	2004	2016

Table 6: Policy and Regulatory Documents relevant to Private Developers

Source: Author (2021)

3.2 Developer's profile

Two sets of semi structured interviews were conducted for the purpose of the research. The first set with government officials and the second set with private developers. The first set which interviewed two respondents from the government includes a senior urban economist from the Ministry of Works and Human Settlements who has been actively involved in the formulation of housing strategy for the National Housing Policy of Bhutan 2019, as well as the upcoming housing bill. The respondent was a very useful source to not only understand the components of supply-side constraints which includes planning and regulatory dimensions, but also helped to build better background for existing dynamics by giving some unbiased insights on existing problems. The second respondent interviewed was the Deputy Executive Engineer from Thimphu Thromde. The official has been involved in building design approval and construction compliance for proposals under the jurisdiction of Thimphu Thromde. The interview helped the researcher understand the requirements of building codes as well as governmental approval process for construction. Following this, semi structured interviews were conducted with 8 private developers.

Most developers in Thimphu practice informally, which means they are not registered with the construction association of Bhutan or the construction development board of Bhutan. The research takes into consideration the mixed nature of developers in Thimphu; thus, the respondents consist of a mix of formal and informal developers which can be seen in the *table 7* below. Initially there were a few private organizations working on housing development, however, in current scenario the housing development is carried out mostly by single entities. The respondents were carefully selected to bring in a mix of educational backgrounds of developers. Each respondent was asked questions as detailed in the interview guide to understand well the housing situation in Thimphu specific to the concepts of HVC and SSC. The interview gets into the depth of extracting DP on the AHD scenario as experienced by them. The qualitative data collected and analyzed helped the researcher explore and understand the constraints on the HVC from the developer's point of view.

Code	Educational Background of the developer	Type	Registration with construction association of Bhutan or construction development board	Number of housing projects developed	Number of years involved in housing delivery	Target Market (LIG, MIG, HIG)
Resp1	Architect	Single entity	No	2	4	MIG
Resp2	Architect	Single entity	No	1	2	MIG
Resp3	Civil Engineer	Single entity	No	3	10	MIG
Resp4	Architect	Company	Yes	6	10	MIG
Resp5	Secondary education	Single entity	No	2	3	MIG

Resp6	Accounts	Company	Yes	5	5	MIG
Resp7	Structural Engineer	Single entity	No	4	3	MIG
Resp8	Engineer	Company	Yes	6	11	MIG

Table 7: Respondent's profile

Source: Author (2021)

3.3 Data Preparation and Analysis

This section presents an overview of the analysis of the data collected. In line with section 3.2, the research analyzed the data collected using Atlas ti software. The codes were created as per the operationalization tables in Chapter 3. Along with the codes from the operationalization table, additional codes were also created considering their regular occurrence during the coding process.

Table 8 below shows the number of quotations for each concept as well as its underlying variables. It gives an overview of the number of times a particular concept and its variables have been quoted in the interviews.

Concept	Variable	Quotes
Housing Value Chain of Supply-side (HVC)	Land Acquisition	32
	House Construction	66
	Basic Infrastructure Provision	8
	Total (HVC)	106
Supply-side constraints (SSC)	Development Control Regulations	124
	Physical Constraints	4
	Total (SSC)	128
Affordable housing Delivery (AHD)	Income Expenditure	4
	Housing Stock	4
	Total (AHD)	8
Developer's Perception (DP)	Profitability	24
	Acceptability	58
	Total (DP)	82
New Codes	Educational Background of Developer	08
	Construction Culture	12
Total		322

Table 8: Overview of number of quotes

Source: Author (2021)

It is important to note that the concepts and variables with less quotes are not less relevant. For instance, the relatively low number of quotations under AHD concept can attributed to the limited knowledge of developers on the income expenditure and affordable housing stock. Moreover, in comparison to other concepts, the AHD had only 3 indicators, which translated into lesser interview questions, and subsequently produced less quotes. It should also be noted that the data required for AHD were more statistical and were also collected through secondary sources. On the other hand, the developers actively participated in topics related to land acquisition and house construction under the concept of HVC as they had more hands-on

experience on these topics. Same was the case with development control regulations and developer's perception which generated large number of quotes. On a broader level, variables with maximum quotes were observed to be of greater importance to the private developers for affordable housing delivery; therefore, they could share more information for the variables by quoting a lot of examples from their experience. It can also be noted that new codes were formed based on the answers given by the developers. The new codes include educational background of the developer and construction practice culture. These new codes were seen to affect the HVC.

3.4 Data Description and Interpretation

This section presents detailed description of findings and interpretation for each concept and its underlying variables and indicators.

3.4.1 Housing value chain of supply-side

The findings for the independent variable – *housing value chain for supply side*– with respect to its three variables – land acquisition, house construction (design and construction), and basic infrastructure provision is presented in this section. Data for the variables were collected through semi structured interviews and through secondary data wherever required as per the operationalization table. *Table 9* below gives an overview of the number of quotes per indicator.

Variable	Indicators	Quotes	Percentage
Land Acquisition	Minimum timeframe for land identification	2	1.9%
	Minimum timeframe for land acquisition	6	5.6%
	Land acquisition cost relative to total cost of housing provision	24	23%
House Construction			
-Design	Number of approvals required for house construction	3	2.8%
	Minimum time required for mandatory approvals before house construction	16	15%
-Construction	Accessibility of bank loans for housing construction	17	16%
	Amount of construction material import	16	15%
	Amount of construction labour import	9	8.5%
	Cost of house construction relative to the total cost of housing provision	5	4.7%
Basic Infrastructure Provision	Minimum timeframe for basic infrastructure provision	5	4.7%
	Cost of basic infrastructure provision relative to the total cost of housing provision	2	1.9%
	Share of cost borne by government	1	0.9%
Total		106	100%

Table 9: Number of quotes per indicator for the variables of HVC

Source: Author (2021)

Of all the indicators, the *land acquisition cost relative to total cost of housing provision* gathered maximum quotes by occurring frequently in discussions. Following the land acquisition cost, *accessibility of bank loans for house construction* was the second most addressed indicator. Almost

all developers highlighted the cost of land and construction finance as the main affordability determinants followed by other factors like *amount of construction material import*. The indicator *minimum time required for mandatory approval before house construction* was also quite apparent in almost all interviews. However, it did not seem to affect much on the affordability as the previous mentioned factors. Moreover, the experiences of getting approvals varied among the developers. The findings are presented in detail for each variable through its indicators in the following sections.

3.4.1.1 Land Acquisition

Land acquisition is a very important step especially in Bhutanese context where the development entity in most cases must buy or own the land on which they are building on (RGoB 2007). From the interviews and secondary data collected, it appears that the cost of land in Thimphu is what affects the whole land acquisition process. Land identification and minimum time frame for land acquisition were not considered an issue by the developers. The sections below present the details for each indicator.

- **Land Identification**

All the developers expressed that land identification was not much of big deal. They were aware of land scarcity in Thimphu and in most cases the land they had for development were either hereditary or bought at least 10 years ago. In present-day situation, some resorted to partnering with landowners for shared profit in order to address the issue of expensive land. A formal developer who has worked in diverse projects shared that they never looked for land, but rather looked for potential clients who have land (Developer7, interviewed on July 2021) .

- **Minimum timeframe for land acquisition**

The land act of Bhutan 2007 details out land transaction from section 159 to 164 (RGoB 2007). In ideal situation, land acquisition ranges from two to three months according to the nature of transaction. However, as per the standard operating procedure (SoP) of Thimphu thromde, it specifically should take 40-47 working days (Thimphu Thromde 2010). To make the process more convenient, National land commission secretariat (NLCS) implemented online system called *Urban eSakor* for processing the urban land transaction in 2013. Some of the common views on land acquisition process included the importance of ‘planning better’ to make the process easier for oneself. Developer who has been in housing business for 4 years in Thimphu said:

“I think it's all about how you plan. Some tend to become a partner with the ones who have land, so the whole process becomes easier. We do not need to look for the land, location and try to buy or negotiate. Otherwise, I think it takes more than four to six months, six months maximum, but at times we can procure very easily. Regarding the one we have done recently, I think it took us around two months” (Developer1, interviewed on July 2021)

- **Land acquisition cost relative to total cost of housing provision**

From the interviews and the secondary data, it appears that the land acquisition process is greatly impeded by the cost of the land. The Strategic environmental assessment (SEA) for Thimphu structure plan and National Housing Policy (NHP) 2019 acknowledge high cost of land and how it continues to rise exorbitantly, making it unaffordable for middle- and low-income people to own land (MoWHS 2018, 2019). The respondents share similar stories of land values multiplying unreasonably every year and how the land cost amounts close to 50% of the total cost of housing provision. A formal private developer, who’s been in construction business for 10 years said, *“Usually in Bhutan, almost 50% of the project cost will be your land cost. If I put the cost of the land against the cost of the building for a plot of land that I bought, it almost amounts to 50% of the building cost, which is a very high ratio and very high in comparison to the situation other countries as well. We’ve heard a lot of the times from even the FDI projects*

that come to Bhutan that cost of the land should be only 5-10% of the total project cost. But in the case of Bhutan its way higher. So, for a private developer to do anything on low cost or affordable concept is a far cry” (Developer1, interviewed on July 2021).

To triangulate the claims made by developers, the highest land value rate offered for urban core precinct as per Property Assessment & Valuation Agency (government rate) by Ministry of Finance was checked (MOF 2017). The government rate was Nu. 1,282,823.85 (12.8 lakhs) per decimel in urban core precinct which, however, was more or less the same rate for zones away from the urban core as per the private developers. *“For my project of seven crores, we invested 1.3 crores land. Something like 18% to 18.5%. That was two years ago. The rate of land which we have procured at six lakhs per decimel will sell at a of minimum 13 lakhs in zone of urban village 2. So, it is more than double. If you will think of buying it now, the cost per unit will be very high”,* said a new informal developer who has worked in three housing projects” (Developer2, interviewed on July 2021).

Similarly, the Sr. Urban Economist also shared, *“Land market is the main challenge that we have. The land cost is shooting, it is not profitable for private developers”*

3.4.1.2 House Construction

The house construction takes place in the steps of design and construction as mentioned in chapter 2 and 3. From the data collected, the private developers referred to ‘*minimum time frame for approval from government*’ quite frequently from the indicators of design dimension. From their perspective it seems that the process of getting approval seems to depend on various factors like educational background of the developer, personal connections with the approving authorities, and quality of design proposals.

a) Design

• Number of approvals required for house construction

Any person or body intending to build within the limit of Thimphu thromde boundary shall need prior permission from the Thimphu Thromde as per the Development control regulations 2016 (Thimphu Thromde 2016). An application is submitted to the thromde by legal owner of the plot or authorized signatory. Along with the application, proposed technical drawings, land ownership certificate, site plan, designers’ certificates, and no objection certificates from relevant authorities have to be submitted wherever applicable. The applications have also been categorized as major (above two floors), minor (single storey) and green channel construction applications which are devised to expedite proposals through certified designers for proposals up to two floors. As per the private developers, the main expenditure in this particular step goes in the design and preparation of drawings depending on the type of designers hired.

• Minimum time frame for approval from government

Housing products provided by the private developers are usually multi-storied. Therefore, housing proposals are subject to ‘major construction application’ procedure. As per the SoP of Thimphu thromde, turnaround time for these proposals is projected as 23 working days provided that the proposal meets the rules and standards (Thimphu Thromde 2010). The information gathered from the respondents about the minimum timeframe for approval opened a mixed bag of opinions with a common agreement on the necessity to know the people in the Thromde to help expedite their approval.

An informal developer working as a single entity for 10 years said, *“Coming to governmental approvals, I seriously feel that you need to know the people there. I mean, you do not have somebody to push your approval and if you're completely new or stranger and you have put up*

your proposal for approval, I think you get a lot of hiccups in between”, (Developer3, interviewed on July 2021).

While according to a developer having an architectural background said, *“In terms of approval system required from government I think we do not face much problem. The drawings and all proposals have had a smooth ride in getting approved”*, (Developer2, interviewed on July 2021).

Similarly, another developer heading a reputed company for 10 years said, *“Yes, it is easy, but as said, it’s easier if you know someone in the offices. Like if there is a stack of approvals, you will have to wait your turn for approval. But if there is somebody you know, they can always speed up the process”*, (Developer4, interviewed on July 2021).

It was evident that the educational background of the developer also mattered in approval procedure. If the developer is from a technical background like engineer or architect, he/she will know the approving authorities, while on the other hand for lay man or someone from non-technical background, things get slower for them. Some of the difference regarding educational background can be seen below:

Developer who is succeeding his father in the business said, *“It was my father who had gone to seek approval for the procedure, or the proposal. Sadly, it took him almost a year to get it approved. My dad was a non-technical person. Now look at the cost of material, how much will it increase in one in a year, it will be it will make a lot of difference. One year is a lot of time, a lot of prices escalate, and rates of material increase bring substantial change in the budget.”* (Developer3, interviewed on July 2021)

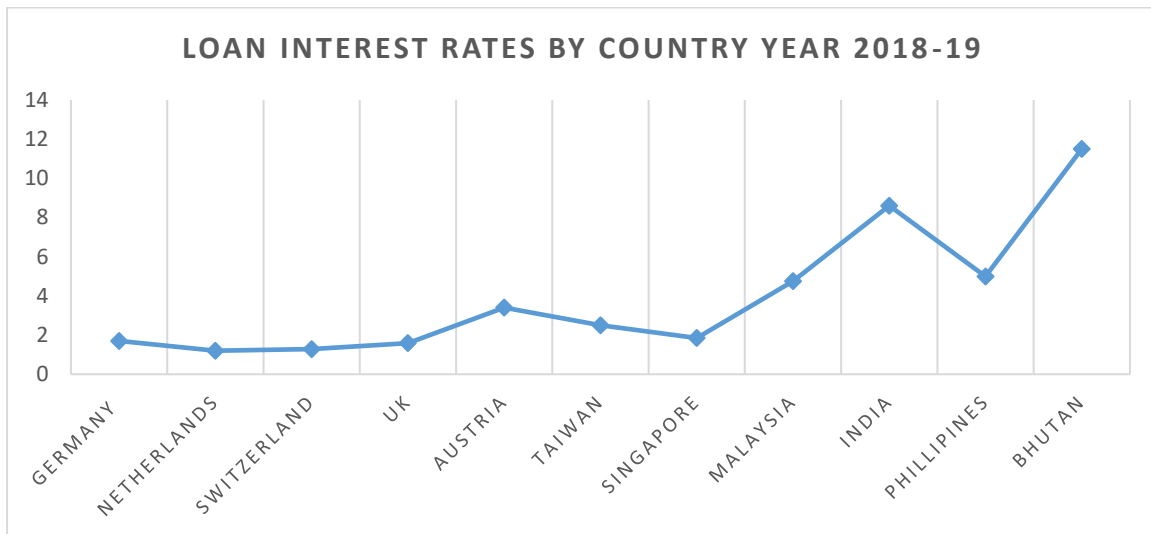
On triangulating the information received from the developers with the structural engineer in Thromde, he said, *“practically it takes a bit longer than the standard operating days given, it all depends on how well the drawing is prepared”*. He said the common practice among small scale developers is that they do not go for qualified designers, but instead they go for someone who can just translate their concept based some thumb rules or assumptions. He said they try to save a little but later end up incurring higher cost through revisions and delayed work at site. He shared, *“I think that people see municipality just as a place to blame. We do not try to go very into details, but in many cases, not all the basics of standards things are done correctly or adequately. So how is it possible for us to approve the drawings under those conditions, I’d say there lacks a certain degree of professionalism”*.

b) Construction

• Accessibility of bank loans for house construction

At present, housing loans from financial institutions and private savings are the only sources of equity for private housing developers (MoWHS 2019). The high interest rates on housing finance have been highlighted in NHP and World Bank urban policy notes as a matter of concern (MoWHS 2019; World Bank 2020). Non-commercial housing loans are provided at an interest rate of 10.75% percent by the Bank of Bhutan (BoB); 11 percent by the Bhutan National Bank (BNB); and 13 percent by the Druk Punjab Bank (DPNB). All commercial housing loans are mostly a percent higher than the non-commercial housing loans. While the rates are somewhat comparable to those in India, where the State Bank of India provides housing loan at an interest rate of 8.55 to nine percent, they are relatively higher than in other countries (MoWHS 2018). The *graph 1* below shows how the Bhutanese lending rates are way

higher its neighbors as well as from those providing affordable housing including the European countries.



Graph 1: Loan interest rate by country for year 2018-19

Source: Adapted from (financial advisory.com 2019)

The developers acknowledged the availability and easy procedure in most cases while at the same time they expressed the strain of high construction finance rates which inevitably makes their products unaffordable.

A developer mostly involved in homeownership business from the past 4 years said, *“I think the government should come up with such a scheme whereby the interest rate should be slightly or at least 3 to 4% lower. The cost of selling is related to how much we have invested. That's why I think the financing part has become the biggest hurdle in trying to provide for the lower income group.”* (Developer1, interviewed on July 2021)

“Disadvantage for me as a developer I would like to highlight the difficulty of accessing loan and acquiring land given the very expensive rates”, (Developer2, interviewed on July 2021) said another developer with 2 years of experience in the market.

- **Amount of construction material import**

The cost of construction materials is one of the factors contributing to high cost of housing construction. Construction materials constitute 60-70% of the construction cost (Alabi and Fapohunda 2021). In case of Thimphu, while some materials are locally available, most of the raw materials and specialized items (plumbing, mechanical, electrical) are imported especially from India. Moreover, the construction cost is further escalated by high transportation cost (MoWHS 2019). The developers also shared that they are still skeptical about the materials produced in the country due to factors related to quality and partly due to cultural barriers.

A developer of engineering background said, *“A lot of materials are these days available within the country but the quality of the materials produced inside is still questionable. The local bricks promoted by MoWHS received a lot of complaints from many organizations. We even started using the local bricks recommended. But once the bricks are taken to a site, more than 50% of the bricks are broken, they end up breaking in a single trip. So, there was a lot of issue regarding the quality of the products produced within the country”,* (Developer3, interviewed on July 2021).

Another developer who is an architect expressed how he's still not sure about new materials, *"Recently, we also have autoclaved aerated concrete (AAC) blocks in the market, these are very light weight materials. The use of ACC blocks can help you save up to 10-15 percent of the cost due to its character of being light weight. The only disadvantage of AAC block that I have seen is some hairline cracks. I used AAC blocks in my previous project but for my next project I want to move back to red bricks, because all these stuffs like AAC is new, and we can't know how it will turn out in future or next 20 years. Its use is not time proven; so, I would rather stick to red brick to be safe"*, (Developer2, interviewed on July 2021).

He further adds about how the import is the only choice *"The local materials cannot be used in buildings of 5-6 storey which are ideal for housing development. For this kind of housing projects, we must use steel rods and concrete. Of course, the aggregates are locally produced, be it sand, cement etc and also timber used for door-window components are all locally available. The use of local hollow bricks and indigenous materials like stone, rammed earth, and others are only suitable for maximum two storied structure and for boundary wall in some cases."*

In the interviews it was also learned that indigenous materials like stone, rammed earth and hollow bricks are not suitable for housing projects which usually are more than two storeys. Thus, the import currently is inevitable and in fact cheaper and more reliable than local materials. However, the import coupled with transportation cost is what adds up to the cost which otherwise could be avoided had all the materials been available in the country.

- **Amount of construction labour import**

There has been little mention about construction labour in important policy documents. The only mention of it is in the TSP which highlights the inadequate situation of national skilled labour force and how it requires immediate government attention (MoWHS 2004). According to the document, the development of national skilled labour force was said to be suppressed by the existence of underpaid supply of foreign labour which still holds true for today's scenario. According to Department of Revenue and Customs, Bhutan has been importing large quantity of construction materials from India every year. In 2015, the industry recruited about 44,535 foreign workers while only 6,241 Bhutanese workers were employed by the industry (National Construction Industry Policy, 2018). Just as the construction material, the import of construction labour is also a cheaper and more efficient option for developers than the local construction labour. Almost 100% of the labour is imported in the private housing projects. According to the developers, foreign labours are about 50% cheaper than the local ones, however in situations like CoVID-19, especially the quarantine procedure has put a great pressure in the developers' pockets.

"Besides the spike in prices, labour and material shortages have become a major challenge. Contractors say that construction material prices have increased by up to 50 percent since the implementation of Covid-19 safety protocols on import of construction materials", reported the national newspaper (Subba 2021).

A formal developer who has been in housing business for 5 years said, *"The current market rate for labor wage for Bhutanese on an average around is around Nu.800-850 per day. But for Indian labors, except for that quarantine expense, they are readily available at 450. So, there's a big gap. For Bhutanese labour its 850, plus, we must give them daily meal, that is really expensive"*, (Developer6, interviewed on July 2021).

A formal developer who has worked on 5 housing projects in Thimphu, also shared how the construction technique being practiced in Bhutan is very labour intensive and does not involve very skilled labour which is why it leads to a high percentage of wastage. He says, *"A lot of*

money is wasted in the wastage materials because our labours are not very skilled. The way we need 100 labours to do a construction shows that construction technique is very primitive” (Developer4, interviewed on July 2021).

3.4.1.3 Basic infrastructure provision

The basic infrastructure provision includes site development including paving, parking drainage, and sewerage. Having these basic components are also mandatory requirements as per Bhutan Building regulations 2018. When asked about the minimum time taken for the provision of basic infrastructure, most of the developers said it does not take more than two months to do it. In terms of cost too, there was a consensus that it amounts to below 10% of the total cost of housing provision. They said that many places in Thimphu already have a major sewer line network making it easier for developers. A developer who recently completed a project said, *“cost spent on basic infrastructure provision is very negligible. We do not even have to provide them with septic tank in UV2, there is availability of municipal sewer line, we just directly connect to it. Parking is also not a problem.”*

An informal developer with secondary level education said, *“it cost me about 4 lakhs overall mainly with extended parking from the plinth protection, so about 1-2%.”* A lot of the work is also made easier with government sharing the amount of work. He continued, *“government does most of it, because they provide sewage, water and electricity services adjoining every plot area. We just need to connect our lines to their main source placed near the plot. Even the drains in the roads adjoining the house were built by the government.”* (Developer5, interviewed on July 2021)

3.4.1.4 Synopsis of findings for HVC

The findings from the information gathered from primary and secondary data sources indicate that HVC in Thimphu is to a great extent weakened by the cost of land in its land acquisition step and high interest rates on construction finance in its house construction step. The cost of the land as per the private developers goes up to 50% of the total cost of housing provision. The land lease option is also not accessible for private small-scale developers as most of them function informally. With regard to construction finance, the interest rates ranging between 11-13% for 20-year time period, making it very expensive for private developers. Secondly, the amount of construction material import also weakens the value chain to a certain extent through transportation costs and taxes as most raw materials and specialized items are imported. Along with construction material, almost 100% of the construction labour in Bhutan is imported from neighboring countries. The labour import does not impact much on the cost as it is cheaper than the local labour. However, the dependency on construction material and labour import can disrupt the affordability levels in the housing value chain during unforeseen situations like covid-19.

Along with these determinants of affordability, some additional information surfaced which indicated the importance of developer’s education level in expediting approval processes. With their technical knowledge and professional connections, developers of technical background were able to save time which would otherwise incur additional cost in case of delayed projects. Not only this, the developers of especially architecture and engineering background indicated that there were ways of playing with the structure through design to gain additional spaces which would also help lower the cost as the total cost gets divided by a greater number of units. Another factor that was pointed out to weaken the HVC was the construction practice culture in Thimphu. This was observed in the labour imported for construction, which were suggested as not very skilled ones. Due to this the developers said that the construction practice generated

greater wastage of materials. In spite of the knowledge on newer materials and techniques, the construction practice in Thimphu appears to be such that developers hardly experiment with newer lightweight materials as the newer way construction style and technique were not time proven for them. Therefore, the traditional construction technique being labour intensive, leads to greater wastage and hence affects the affordability as well.

A graphical synopsis of the finding is presented below:

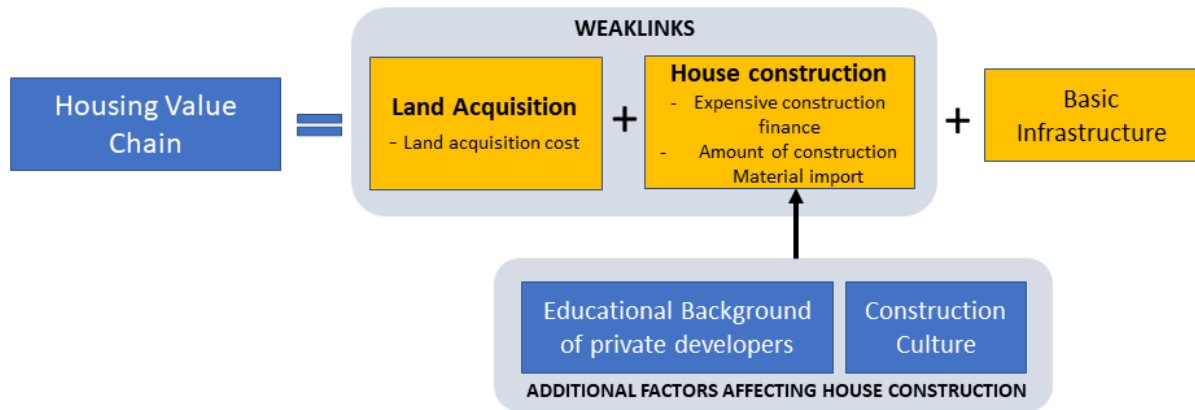


Figure 3: Graphical synopsis of findings for Housing Value chain of supply-side
Source: Author (2021)

3.4.2 Supply side constraints

As per chapter 3, concept of supply-side constraints was divided into two variables, which are the development control regulations and physical constraints. Most data for development control regulations were collected through semi structured interviews while the data for physical constraints were collected through secondary data. However, there were a few instances where physical constraints were also mentioned by the developers in the interviews. Table 9 below gives an overview of the number of the times a particular variable and its underlying indicators of supply-side constraints were highlighted by the developers in the interviews.

Variable	Dimension	Indicators	Quotes	Percentage	
Development Control Regulations	1. PLANNING	and	Types of landuse incentives available	6	5.7%
			Level of knowledge of landuse regulations	16	15%
			Level of knowledge of zoning regulations	8	7.5%
			Number of participations in formulation of regulations	7	6.6%
	- Bulk infrastructure Provision		Availability of connection to main transportation network	6	5.7%
			Availability of connection to main sewer line	4	3.8%
			Level of cost implication in absence of bulk infrastructure	1	1%

2. REGULATORY		Level of flexibility in structural standards	7	6.6
		Level of flexibility in architectural standards	8	7.5
		Level of flexibility in mechanical standards	4	3.8
		Level of relevancy of building codes to context	20	18.9
		Level of knowledge on building code requirements	10	9.4
		Level of affordability considerations in building codes	3	2.8
Physical Constraints	Topography	Amount of land with slope above 30%	1	1
		Amount of land in environmental and green zones	3	2.8
Total			106	100%

Table 10: Number of quotes per indicator for the variables of SSC

Source: Author (2021)

The indicator *level of relevancy of building codes to context* surfaced in most conversations. The developers talked mainly about the relevancy of structural and architectural codes. On one hand, some questioned the relevancy of structural requirements as imposed by the approving authorities as well as the stringency of traditional architectural requirements which they feel should evolve to encourage affordable housing in new forms and materials. Contrastingly, some felt that the buildings were much more resilient with the kind of structural codes imposed and also were in agreement with the need to preserve culture through traditional architecture elements. The *Level of knowledge on landuse regulations* was the second most discussed indicator. Most developers had good level of knowledge about the prevalent landuse regulations as these are the regulations which defines what, where and how much they can build. Therefore, they had a lot to say about how it limits and how it can potentially help them to venture into affordable housing supply. Detailed findings are presented in the following sections.

3.4.2.1 Development control regulations

a) Planning

- Zoning and Landuse regulation

As per the Thimphu Structure Plan, zoning in Bhutan identifies suitable land uses and population densities for different areas in the city into precincts. Some examples of precincts include urban core, urban hub, urban villages, traditional village, etc. These precincts are regulated by land use controls primarily through density and building activity (number of floors, plot coverage and so on). There are hardly any landuse incentives mentioned in the DCR (2016) for private developers. Against each precinct is strictly mentioned the maximum allowable standards with no room for flexibility for special housing projects. Moreover, in the current system, government land can be released to private entities only through lease with a maximum lease period of 30 years.

- Types of Landuse incentives available

When asked about the kind of landuse incentives made available to them formally or informally, a common mention about attic rules emerged. To maximize the land use and

revenue, most developers resorted to making hidden attics for habitation which otherwise is not allowed as per the regulation. They shared that there are talks of legalizing these attics from the government's side and that this may come out as an incentive in the form of additional floor. An informal developer said, *"government is trying to regularize the jamthog (attic) because the practice though illegal has become rampant that to ensure that they are about to repay their EMIs for the loans they have taken this step"*, (Developer2, interviewed on July 2021). Other than the attic regularization, there is no other landuse incentive or flexibility in place for developers.

- Level of Understanding of landuse and zoning regulations

6 out of 8 developers understand the zoning and landuse regulations very well since most of them come from a technical background and some are in fact former government employees. A common concern on the requirement of revising regulations arose considering the land scarcity. The developers indicated the current regulations limit the developers from producing something affordable given the high land values coupled with inefficient use of land. A developer heading a company in the city for more than 10 years said, *"The more we can build in a piece of land, the lesser will be the cost of final housing products. It's cheaper to in fact build a multi storied building than a duplex"* (Developer8, interviewed on July 2021). They also intimated about the ambiguity regarding the allocation of environmental zones termed as agribased environment (E4) zones. These are areas with slopes greater than 30 degree and is only suitable for orchards as per TSP. However, a developer who is architect by profession said, *"sloped undevelopable land is no more relevant. I think it should be relevant even in 45. For example, if you divide a square diagonally, it will be 45 degrees exactly. And if you pile up two squares, that's a perfect split house. So even at 45, I don't believe I don't agree with the regulations"*, (Developer1, interviewed on July 2021). Another architect developer shared, *"coming to height restrictions, they have a lot of reasonings backed with cultural preservation and others, so it does make sense. But I do feel that having at least 2 storeys extra for new constructions knowing that land is almost saturated in Thimphu, would make a lot of difference in trying to bring down the cost of housing"*, (Developer2, interviewed on July 2021). They suggest an urgent need for proper study to revise the regulations to address the land scarcity. The strategic environmental assessment for TSP also reviewed the relevancy of E4 zones indicating that some urban villages have slopes even higher than 30 degrees.

- Number of participations in formulation of regulations

As for number of participations in formulation of *regulations* only 2 of 8 developers had participated in few meetings. The participations were however not very impactful as can be seen from the quote which says, *"Most of the time when it comes to private sector involvement, it's always been kind of similar experience, whereby most of the things have already been decided. We would love to participate but currently that's not happening. I think in the private sector people are far more open, experienced and have the potential to give realistic views and suggestions"*, (Developer4, interviewed on July 2021). The developers were enthusiastic about participation and collaboration if ever they get an opportunity as they understand ground realities more than the government officials and approving authorities.

- Bulk infrastructure provision

Thimphu being the capital city has well connected transportation network within the boundaries of the municipality. All developers agreed to the presence of road and sewer lines and how it made their work easier especially for transportation of materials. A developer who just completed a project shared, *"For my recent project, they had already everything in place,*

the water connection, sewer connection, and even road, road was very friendly during the construction because it was almost paved. And the road width is well planned, and we had no trouble in bringing materials in bigger trucks”, (Developer6, interviewed on July 2021) All of them talked in similar lines such as, “most of the sites in Thimphu, I think the site is really friendly and it's enabling for the builders”, (Developer8, interviewed on July 2021)

b) Regulatory

Building Codes

As the housing delivered by private developers are usually more than 2 storeys, the construction method popularly applied becomes reinforced cement concrete (RCC) construction. This is mainly because RCC construction is what people have been practicing for over decades and is the most trusted form of construction. The construction must comply with Bhutan building regulations 2018 (BBR), which is further supported by building code of Bhutan 2018. The BBR highlights the use of Indian standard (IS) codes for concrete and steel structures in line with the earthquake resistant design codes of seismic zone V of India. Not much detail has been given in both the BBR and building codes about the adaptation and background behind the codes.

o Flexibility of structural standards

When asked about the level of flexibility a developer of engineering background said, *“I have observed that they follow a minimum thumb rule for the number of rods required in Thimphu Thromde. And we must meet that and if we don't meet that thumb rule, we do not get the approval. Being structural engineer myself, I had designed and calculated myself, but it did not meet their thumb rule and so the approval is not given to you. Even though you might have designed the building as safely, but the approving authorities also want to be safe and that's why they demand the building to be over reinforced”, (Developer3, interviewed on July 2021). He continued, “when the whole structure is five floors or 6 floors, your structure ends up becoming over reinforced at each and every level, the cost escalates to quite a significant amount.”* The developer here says that the approving authority rather than being flexible would instead go by a thumb rule requirement which usually little extra on structural requirements than the standards mandated by the IS codes.

o Flexibility of architectural standards

When asked about the flexibility experienced in architectural standards, the developers said that there weren't any flexibilities specified as such, but those with technical background said that there were ways to play with the design to achieve some flexibilities. Usually, the developers with architectural or engineering background were able to justify such flexibilities. One of architects from the developers gave an example, *“I think that traditional features play a lot. For example, to ensure that we maximize the attic floor, we tend to have lean-to roof on the bay window on top of which we have additional roof. By then habitable height is automatically achieved”, (Developer1, interviewed on July 2021). Like others he also reiterated that, “building standards in terms of dimensions of spaces is quite flexible, but it also depends on the person who reviews and approves your proposal”, making discretionary power of municipality important in bringing about some flexibilities.*

o Flexibility of MEP (Mechanical, electrical, and plumbing) standards

The MEP requirements also are not very flexible and must meet the standards. The developers also agree to complying with the standards for MEP, which they feel are justified for safe and resilient design of their structures.

- **Level of Knowledge of the building codes**

The developers conveyed a very good level of understanding of prevalent building codes. Developers of both technical and non-technical background could explain the logic behind the current standards. The architectural standards mostly stem from the cultural preservation pillar of GNH and is translated through the buildings enriched with traditional features and proportions. Due to this reason the heights are controlled, the roofs are mostly gabled, and the front façade of the building must look traditionally adequate. As for structural standards, the developers are aware of the seismic vulnerability of the country for which the seismic codes for zone V of India are adapted in Bhutan.

- **Level of relevancy of the building codes to the context**

Bhutan does not have its own seismic investigation done and directly adapts the seismic codes of zone V of India. Therefore, the developers feel that the approving authority demand the structural design to be even higher than what is mentioned in the IS codes to be safe as an approving authority given the fact that real seismic nature of the country is still not studied. An informal developer of engineering background said, *“To be safe as an approving authority, they do the analysis, but on top of that they multiply the whole analysis by safety factor of 1.2. Being a civil engineer, I don't think that taking an additional safety factor is necessary. With the safety factor 1.2, column and footings become bigger, and so the cost escalates. When we design, we already design it for a seismic zone five. Putting a safety factor of 1.2 is not necessary at all. Yeah, but we are made to do that to get approval”*, (Developer3, interviewed on July 2021). A formal developer said, *“because everyone wants to be safe. And that's why I think our buildings are over designed”*, (Developer5, interviewed on July 2021). On the positive side, the developers said that the building are much more resilient than the neighbouring countries and can endure natural calamities.

In terms of the architectural requirements, developers of architectural background said its high time to debate the relevancy of traditional architectural requirements. They feel that the incorporation of traditional architectural guidelines should allow some flexibility as per the function of the building. A formal developer involved in housing delivery for over 10 years said, *“When it comes to the traditional Bhutanese architecture guidelines, I don't believe in the whole fact that even our toilet windows need to have traditional elements, or even the automobile. I feel the whole architectural language must be debated. Our rules and regulations are subject to the officials who are interpreting them”*, (Developer4, interviewed on July 2021).

- **Level of affordability consideration in the building codes**

As per the content analysis, the building codes of Bhutan do not have any special affordability considerations included in it. The structural standards are strictly adapted from codes of India highest seismic zone. Being in the Himalayan belt, safety from earthquake is considered as a priority before anything else. The civil engineers among the developers felt that even if Bhutan has its own seismic study done, the corresponding seismic codes may not be any different from that being followed currently, however they do feel that regions in the central Bhutan including Thimphu, may be at a lesser risk as than those in the southern and the eastern belt. This would

mean that the structures in Thimphu may still be resilient with lesser reinforcement than what is required now.

3.4.2.2 Physical Constraints

The city is surrounded by forest covered mountains. As per the Thimphu structure plan 2004, about 18% of the total area within the Thimphu Municipal Corporation limits is under forest cover, mainly on the hill slopes. A little more than 15% of the total city area is under agriculture, mainly in the form of paddy fields. A large amount of land is used for apple orchards where the slopes are identified to be more than 30 degrees. The Wang Chhu flowing North to South in the city and the cascading streams that feed it, also cut through the valley. The environmental features collectively claim approximately 48% of the total land within the city boundaries.

The physical features especially slope, geology and presence of water bodies have been an important determinant in the Thimphu structure plan for assigning landuse. The analysis of these features lead to the formation of precincts like environmental conservation (E1), forest conservation (E2), agricultural environment (E3) and agribased environment (E4). It can be observed through the TSP document that the physical constraints not only limit the availability of land but also at the same time influence the landuse and zoning regulations. Although it can be argued that the landuse and zoning regulations are on a broader level influenced by the cultural and environmental preservation policies, on a micro level, the characteristic of the physical environment is what defines the landuse and zoning to be assigned.

3.4.2.3 Synopsis of Findings for Supply-side Constraints

The findings from the Supply-side constraints indicate that variable ‘development control regulations’ through both its planning and regulatory dimensions influences the housing value chain of supply-side. The landuse and zoning regulations under the planning aspect do not cover any incentive for private developers to encourage affordable housing delivery. Moreover, these regulations appear to be top down which is reflected in poor participation of developers in policy framing and implementation despite them being the key actors of housing supply. Besides, the regulations are least flexible as there is not a single clause mentioned in favour of the private developers in both the development control regulations and its supporting documents. It is quite apparent that the mentioned aspects of planning regulations influence the way housing is developed, including the location, heights and coverage allowed. With only maximum of 6 floors allowed in Thimphu and that too not in all zones, the efficient use land is hindered, and this influences the cost of housing produced.

Under the regulatory dimension, the developers mostly pointed at building codes, especially structural and architectural codes. The structural codes influence the way the house is designed and constructed. Bhutan adapts the seismic codes of India, and the developers argued the Thromde demands extra safety factor to be more structurally secure given the ambiguity of the city’s seismic nature. From their perception, the eventual over reinforcement of structures lead to unaffordable products. However, some were satisfied and felt more secure with the resiliency of the structures and did not mind the extra reinforcements. The architectural codes also seem to have an influence in the house construction by indirectly making the developers stick to prototype RCC designs where the replication of traditional elements becomes easy and hence the approval becomes faster. Experimenting with newer lightweight materials would mean variations in proportion of traditional elements and consequently more time spent in approval due to deviation from standard sizes of traditional elements. Therefore, the stringency of architectural elements perhaps demotivated the developers from venturing into affordable projects through lightweight materials as it would require more time to justify the approving

authorities, and more time equates to additional costs. As per the findings, the physical constraints also influence the land acquisition step by limiting the physical availability of land as well influencing the way land use and zoning regulations are formulated. A graphical representation of the findings is represented below:

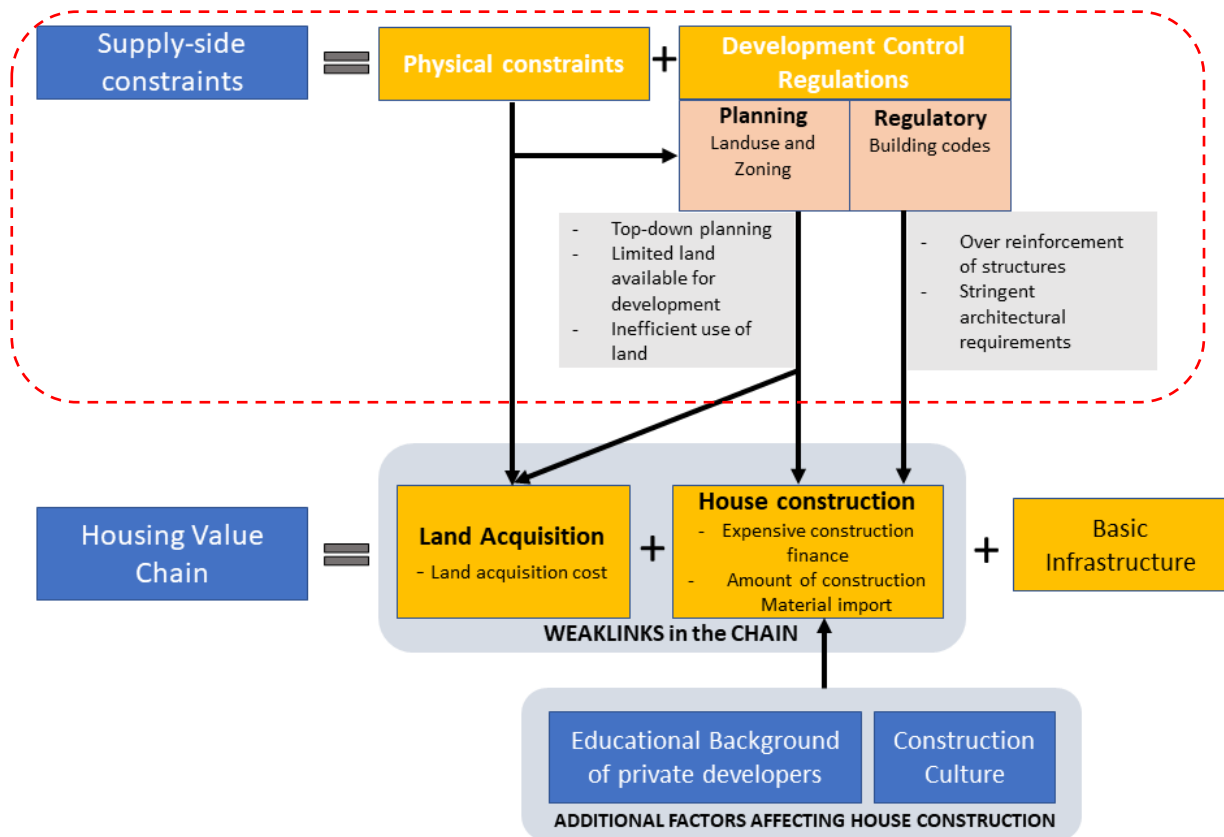


Figure 4: Graphical synopsis of findings for supply-side constraints
Source: Author (2021)

3.4.3 Affordable Housing Delivery

This section presents the findings for the independent variable, Affordable Housing delivery. The data for its variables were collected through both interviews and secondary data. As the data required for statistical in nature, the number of quotes generated are quite low in comparison to independent and moderating variable. Additionally, the lower number of quotes are also because of less indicators. However, the indicators mentioned were enough to gather data for the variable. Table 11 gives an overview of the number of quotes per indicator.

Variable	Indicators	Quotes	Percentage
Income Expenditure	Proportion of income spent on housing	4	50%
Housing Stock	Percentage of affordable housing stock available	2	25%
	Cost of housing units	2	25%
Total		8	100%

Table 11: Number of quotes per indicator for the variables of AHD
Source: Author (2021)

3.4.3.1 Income expenditure

- Proportion of income spent on housing

Currently no data is available on the income and housing cost. The Bhutan living standards survey 2017 does show the house average house rents, but it also includes the households beyond the boundaries of the municipality. As per the figures stated by Sr. Urban Economist from MoWHS, the percentage of income spent on housing accounts to 40% as per a survey they have been working on. He said, “If you look at the household income, median household income of Thimphu, it is 20,000. It means that 50% of the population of households are living below ngultrum 200,00. The median rent is about 8000. The affordability is out of the question.” He further added, “for affordability, we use the thumb rule that the home should not be costing more than three times or 3.5 times the annual income, ours is coming more than 12 times. So, it is very unaffordable.” Even as per the developers, the proportion of income spent on their products by the customers usually costs up to 40% of the monthly household income. They said that the housing they produce are in most cases just basic 2bhk (bedroom-hall-kitchen) or 3bhk targeted at civil servants with regular income. However, they said that even the middle-income group with steady income source struggle to meet the affordability in the basic products provided by them. From their experience, they confirmed that the products for home ownership are usually taken up by upper middle class and high-income group while the low-income and some middle class end up in unaffordable rentals.

3.4.3.2 Housing stock

- Percentage of affordable housing stock available

Currently there is only one official affordable housing project in Thimphu, which is the Changjiji colony initiated by government in 2000. However, the housing units provided by the National housing and development corporation limited (NHDCL), National pension and provident fund (NPPF), and corporate agencies to government employees and its members respectively do account as affordable homes as these units are highly subsidized. All these units are in rental forms. The rental expenditure in these kinds of products does not exceed 20% of the total income. Regarding home ownership, there is hardly any affordable stock or scheme available yet from both government or private.

Housing stock in Thimphu Thromde

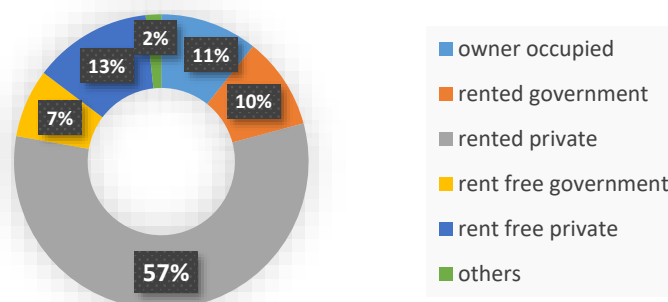


Chart 1: Housing stock in Thimphu

Source: Population and Housing census of Bhutan (NSB 2018)

From *chart 4* above, it can be interpreted that the affordable housing stock available is the total of government units which are rented or rent free. Therefore, it can be concluded that 20% of

the housing stock in Thimphu is affordable. However, as it is being served to government employees with regular salary, it does not necessarily target the ones in need.

- Cost of housing units

As stated above, the rental expenditure affordable units do not exceed 20% of the total income. For instance, The NPPF and NHDCL provided rent-controlled units of a two-bedroom apartment in Thimphu averages around Nu 3,500 a month, which is only 17.5% of the median household income (MoWHS 2018).

3.4.3.3 Synopsis of findings for AHD

Within the current supply-side dynamics, the kind of housing produced by the private developers are targeted towards middle income group and the monthly expenditure on the housing roughly amounts to 40% of the household’s income which is higher than the affordable thumb rule. Moreover, only 20% of the housing in Thimphu can be considered affordable and are provided only by government and semi government entities to its employees. Such a trend can be attributed to easy access of land and finance which the government bodies have better access to than the private developers. The whole housing dynamics indicates a weaker supply response. A graphical representation of the findings is presented below.

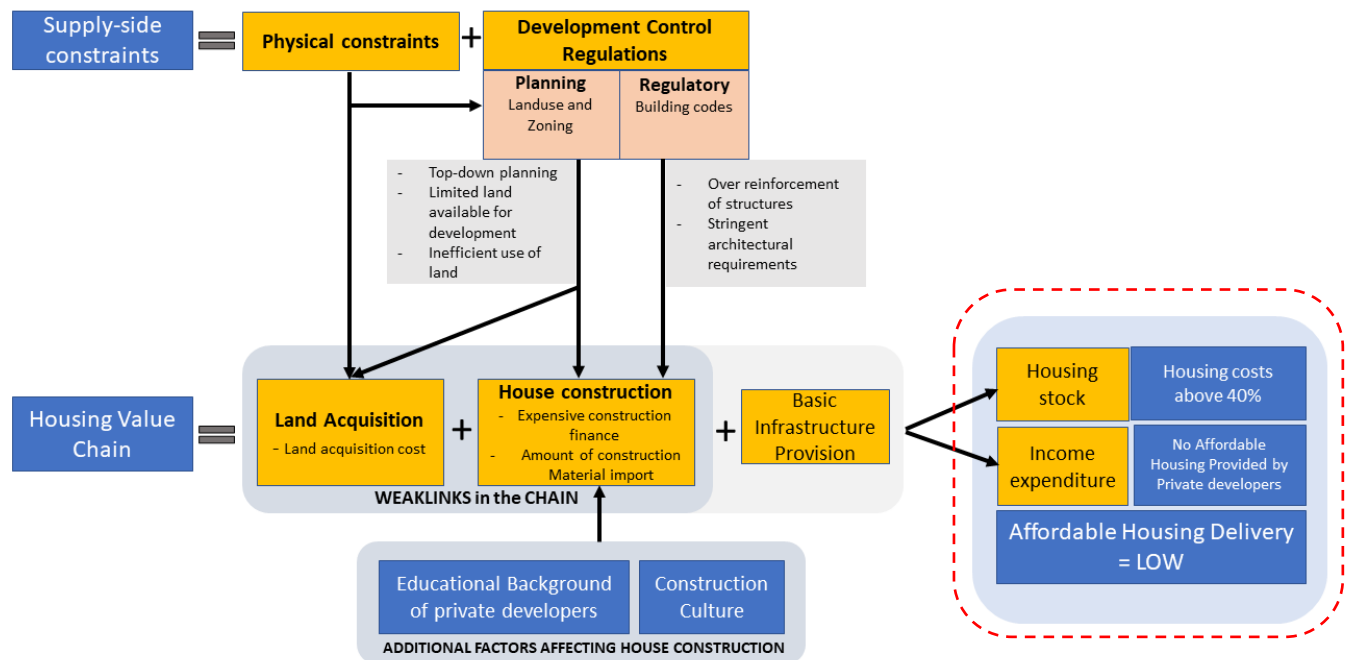


Figure 5: Graphical synopsis of findings for Affordable Housing Delivery
Source: Author (2021)

3.4.4 Developer’s Perception

To understand the status of affordable housing supply better, the developer’s perception on profitability and acceptability of the housing supply dynamics were recorded.

Variable	Indicators	Quotes	Percentage
Profitability	Number of years taken to liquidate loans	15	18.3%
	Minimum time frame for selling/renting out of units	5	6%

Acceptability	Level of satisfaction with development control regulations	27	35.5%
	Degree of enabling environment for affordable housing delivery	11	13.4%
	Willingness to supply affordable housing	20	26.8%
Total		82	100%

Table 12: Number of quotes per indicator for the variables of DP

Source: Author (2021)

From the overview of the quotations per indicator from *table 11*, the acceptability variable was the most elaborated variable. All the developers were least satisfied with the development control regulations, hence it produced maximum opinions on why they were dissatisfied and how it affected the price of their products. The dissatisfaction also runs parallel with their willingness to supply affordable housing which was also very low. The lower willingness to supply was attributed to lower profitability in affordable housing business. Most addressed that producing affordable housing in the policy and market dynamics was beyond their ability, let alone the question of profitability. The indicator *Number of years taken to liquidate loans* was reiterated in discussions as the developers felt that the 20-year timeline for loan liquidation was too less and that it translated into higher unit price. The following sections present detailed findings per indicator.

3.4.4.1 Profitability

○ Number of years taken to liquidate loans

The maximum number of years allocated for loan repayment by banks in Bhutan is 20 years. Especially in rental housing projects the profitability appears to be low for developers where the equated monthly installments (EMI) must be met from the monthly rents. A formal developer who has worked in 6 housing projects said, *“We have now reached a point where the EMI cannot be met with just the rental income as construction cost has also gone up quite a bit, so unless you are able to take out 60% of the construction budget by yourself, the income generated from the housing product, especially rentals, is not enough to pay your EMI in an affordable manner, to be precise if your loan component is more than 50%”*, (Developer4, interviewed on July 2021)

Moreover, the 20-year timeline makes the monthly EMI higher thereby hampering affordability for both developers and households. A small-scale informal developer who’s been in business for 3 years said, *“20-year time is too less. It’s like if you are building now, you’re building for your kids, because by the time it’s 20 years, or even more if you have taken additional loans”*, (Developer5, interviewed on July 2021). In terms of home ownership, the loan liquidation does not take much time as the homes are usually opted by upper middle income and higher income group who pay usually pay the whole or more than 70% down payment.

○ Minimum time frame for selling/renting out of units

It was found that the selling out of the housing units usually does not take much time. Most houses are even booked during on-going construction. An informal developer shared, *“In my previous project, we sold all our units before we finished the construction. We also started advertising and selling it after two or three months after the construction commenced. I think it all depends on the cost”*, (Developer7, interviewed on July 2021). Another developer said that selling out of units is never a problem in Thimphu, *“There is no problem in Thimphu as of now. Given all ministries are here”*, (Developer5, interviewed on July 2021).

3.4.4.2 Acceptability

- **Level of satisfaction with development control regulations**

The developers displayed low level of satisfaction with the development control regulation especially in terms of land use and zoning regulations. Majority of the respondents, especially those with technical background showed discontentment with the building codes. They mentioned how the ratio of the land prices and interest paid on loans is not at all justified with the amount of ground coverage and densities permitted. They said that there needs to be proper segregation of zones with logical reasoning to make the best use of land. One structure engineer among the developers expressed his dissatisfaction saying, *“I have seen E4 zones, some of which are plain and flat, while some are steep; but when it comes to land use rights, all are allowed three storied and 30% coverage. So, I don’t agree to this. Sometimes whole of 20-30 acres of land are designated as E4 but within that itself there is so much plain and flat areas which we feel is developable. So, I think that they have to recognize and segregate with proper reasoning”*, (Developer7, interviewed on July 2021).

They also said that the rules and regulations are conveniently interpreted on the discretion of the government officials. Recently, to solve the issue of parking in Thimphu, *“there's the new thing of giving an extra floor for parking. But in my view, when you're giving an extra floor, just for parking, why can't you give another additional floor to develop it as housing units”*, said a developer of engineering background (Developer3, interviewed on July 2021). The developers were of the view that when it comes to solving issues that are created by Thromde itself (like the mending of parking problem), the regulations were easily adjusted or altered. The same was not possible when it came to solving issues for the developers. For instance, *“we had plans of making like temporary structures like kind of low income until we build something really permanent. We had plans of making these low- income shelters, but it did not get approved. We were asked to make something permanent and sturdy and not resort to proposing that this kind of temporary structures. Yeah, we have been trying to get an approval for that proposal”*, said an informal developer who was trying to experiment in his products (Developer3, interviewed on July 2021).

A formal developer in the city referred to the regulations as *‘blanket regulation’*. He said, *“almost all our regulations because most of them are blanket rules, meaning same rules for all. It’s not subject to individual project type and the need of the project. Our officials are very comfortable by formulating these overarching rules and regulations and just approving and disapproving things based on that. They do not really see things project wise, how a project can be different from the other and how rules can be applied accordingly”*, (Developer4, interviewed on July 2021)

- **Degree of enabling environment for affordable housing delivery**

All the developers agreed on the degree of enabling environment for affordable housing delivery as a poor one. Firstly, there is no proper recognition of these housing developers in particular and so, there are no incentives or flexibilities to encourage them. Given the expensive rates of land and finance, the kind of environment required to enable affordable housing supply is a dream too big. Moreover, with the kind of construction technique being followed which is time consuming and requires materials with more weight ends up escalating the cost of construction. One of the developers who has hopes of soon starting an affordable housing project said that he’s looking into exploring some lightweight materials which are used in Europe to try to cut down the cost of the project (Developer7, interviewed on July 2021). He currently has the design and drawings ready to go ahead with the plan. However, he also did

mention that it was difficult justifying the approving authorities how the traditional architectural elements cannot be represented in its truest forms in the prefab light weight structures. To sum it up, the overall environment for the developers is not in a good form to encourage any affordable housing supply. They hardly have any collaborative role in the policy formulation and implementation including housing policies and other development regulations. A lot of hope lies in the new housing policy which aims at strategies for land, finance, and private sector as well. However, 4 of these developers did not even know that such a policy has been released recently.

- **Willingness to supply affordable housing**

When asked about the willingness to supply affordable housing, all the developers did say they do not mind providing and doing their share to solve the issue of concern for the city. Despite such noble thinking for the city and country, they said they were currently handicapped with the situation of land prices and high construction cost. In practical terms, the developers would only venture into affordable housing supply if the math goes well. *“It all boils down to the profit. After all at the end of the day, if there is no profit from what you are doing, you will not be motivated. If there is some profit in supply affordable kind of housing, why not? That’s the main reason that motivates all others too”*, said one of informal developer (Developer7, interviewed on July 2021).

The developers indicated that a lot of initiative must come from the government to enable them to cater affordable products. *“Support has to come from the government in trying to encourage the developers, I think the support has been quite less from the government and this stops the people from coming out in trying to do things out of their ways”*, said another informal developer (Developer1, interviewed on July 2021). Similarly a formal developer said, *“this cannot be possible unless the government provides low interest loans or tax incentives, supplying affordable homes will be a very difficult journey to embark upon”*, (Developer4, interviewed on July 2021)

3.4.4.3 Synopsis of Findings for Developer’s Perception

The developers expressed that there is no profitability at all in affordable housing provision in current policy context. For them, affordable housing could only be rendered in the form of temporary structures or by cutting down in area like in case of bachelor’s quarters. Other than that, even a simplest unit build in RCC with minimum required standards also ends up becoming not be affordable for the low-income group.

The developers expressed dissatisfaction with the development control regulations. The planning regulations in the form of zoning and landuse limited the maximum use of land as well as the availability of land thereby making land acquisition very expensive. The regulations in the form of structural and architectural building codes incurred questionable costs in terms of additional safety standards and through reluctance to move away from RCC form of building construction style to attain proportionate traditional features in order to save time in approval.

Overall, the degree of enabling environment for private developers appears to be very low starting from the absence of developer’s participation in policy formulation and implementation, lack of landuse incentives, lack of project specific flexibility and lack of formal recognition of private developers. Some of the developers termed the regulations as ‘blanket regulations’. The developers did express their will to supply affordable housing, however at the end of the day their motivation completely depended on the profitability which in current case was very low.

Chapter 5: Conclusions and recommendations

The main purpose of the study was to understand and explain the influence of supply-side constraints on affordable housing delivery by private developers in Thimphu. The research looked into capturing the perceptions of private developers in order to understand the affordable housing delivery in question. After data collection and analysis in the previous chapter, chapter 5 shall answer the questions raised and link them with relevant literature, as well as present some additional findings, relevant policy recommendations and further study.

4.1 Conclusions

Main Question: How do the supply-side constraints influence the housing value chain towards the delivery of affordable housing by private developers in Thimphu?

The results from the research fall in line with the conceptual framework drawn in section 2.5 which assumes that housing value chain of supply-side under the moderating effect of supply-side constraints influences the affordable housing delivery for private developers. As pointed out by Glaeser and Gyourko (2003), Hilber and Vermeulen (2016) and Paciorek (2013), the situation of poor affordable housing delivery by the private developers in Thimphu can be attributed to factors like landuse, zoning, building regulations of the DCR as well as the physical constraints. The perception of private developers about development control regulations being a stringent one seems reasonable as the important regulatory documents like the DCR 2016 also does not reflect any flexibilities or development incentives for developers for projects that may benefit the housing situation in Thimphu. It can be interpreted that development control regulations are quite top-down in nature which is reflected in poor collaboration between the government and private developers in housing sector.

The literature discussions demonstrated that the planning dimension of development control regulations are primary factors responsible for higher house prices (Glaeser and Gyourko 2003; Hilber and Vermeulen 2016). Same is depicted through the results which claim that the planning dimension of SSC through its landuse and zoning influence both the land acquisition and house construction step thereby eventually creating a situation of low affordable housing supply. The land acquisition is impacted directly by the availability of land and inefficient use of land which is limited by the landuse and zoning controls. The regulatory dimension emerges as secondary constraint of the development control regulations. Many have quoted mandatory building codes and approval procedure as key regulatory constraints to housing affordability (Alastair McFarlane 2021; Glaeser and Gyourko 2005; Patel et al. 2018). The findings similarly indicate that the structural requirements imposed additional costs on the total house construction cost and the architectural requirements impacted through substantial carrying cost through administrative delays in case of deviations from the traditional architectural requirements. Together, the regulatory dynamics appear to demotivate the developers with lower the degree of enabling environment to supply affordable housing. Moreover, with environmental features collectively amounting to 48% of the total landuse within the city, the geographical features of the city also aligns with the literature evidence which argues that it directly impacts affordability via reductions in the amount of land availability, and indirectly, via increased land values and higher antigrowth regulations. (Albert 2010; Dong 2016).

While it is seen that the housing value chain of supply is influenced by SSC, it should also be understood that the housing value chain for the context of Thimphu itself appears very weak with the two important steps of land acquisition and housing construction emerging as the weaklinks. These steps are also further influenced by external factors like the educational level of the developer and the construction practice culture in the city. The affordable housing

delivery seems difficult for Thimphu's context where the already weak housing value chain is further affected by the supply-side constraints.

4.1.1 Sub question 1

What are the determinants of affordability on the housing value chain of supply-side?

Identifying importance and issues of each step in the value chain can help improve the quality and cost of the final product (Luenendonk 2019). All the three steps in the housing value chain are equally important for defining affordability to certain extents. However, the key steps culminating from various sub-steps and impacting house prices to a greater extent are land acquisition and house construction. For the context of Thimphu, the private developers perceived the cost of land as the major factor impacting the land acquisition step. As for the house construction step, the expensive construction finance was pointed out to be the root of the problem. As a value chain is a combination of set of steps, it cannot be ignored that other substeps like the amount of construction material import and labour import also influence cost of house construction as close to 70% of the materials get imported and almost 100% of the labour gets imported. Similarly, the time taken for governmental approvals also can be problematic depending on external factors such as educational background of the developer. Therefore, the land acquisition and house construction steps of the value chain determine the affordability of the final product along with other external factors.

4.1.2 Sub question 2

What are the common constraints faced on the housing value chain of supply-side?

Literature on supply-side depict inverse relationship between development controls regulations (especially landuse and zoning) and house prices. Some have also identified regulations and geographic constraints as critical and complementary elements that limit the supply responsiveness (Glaeser and Gyourko 2003; Paciorek 2013). For the context of Thimphu, landuse and zoning regulations definitely play a key role in moderating the path of housing value chain towards affordable housing delivery. As a part of development regulations, landuse and zoning affects the land acquisition as well as house construction step thereby constraining the process of affordable housing supply. The land acquisition step is also affected by the physical constraints which limit the land availability while at the same time influencing the planning regulations. The complementary nature of physical constraints in affecting house value chain directly and indirectly by influencing the planning regulations is observable for Thimphu's context. Besides planning, the regulatory aspect in the form of building codes also impact the house construction and demotivated the developers from affordable housing delivery. The housing situation in Thimphu suggest that codes are framed for quality constructions, and the authorities are observed to give minimal consideration to the impact of the codes, and similarly the household income is least considered while formulating the codes (Patel et al. 2018).

4.1.3 Sub question 3

How does the housing product delivered by developers respond to affordability indicators?

The housing products delivered by the private developers do not respond well to the affordability indicators. The available affordable housing stock is only provided by government and semi government bodies to their employees. On the other hand, the private developers aim their products at middle income group, and its cost usually amounts to more than 40% of a

lower household monthly income in Thimphu which exceeds the affordability limits mentioned in literature (Ayala et al. 2019). Given the weak housing value chain which gets further influenced by supply-side constraints, the developers target their products for home ownership for middle income group which sometimes was also not affordable for the targeted group. Within the context of high land value, expensive construction finance, stringent building codes, and poor construction culture the basic form of housing provided by private developers do not meet the income range of the low-income group. Therefore, as already mentioned in chapter 4 the home ownership rate in Thimphu is very low comparing to rentals. This can be attributed to the fact that taking out one-off payment for the households become difficult. However, rental form of supply was observed to be unaffordable for developers as it took them many years to recover the investment and generate profit. The rental providers usually were the ones with sentimental value attached to the land.

4.1.4 Sub question 4

How do the private developers perceive the impact of supply-side constraints for the delivery of affordable housing?

From the research it appears that the supply side constraints in Thimphu have a considerable impact on delivery of affordable housing by private developers. From their experience, the developers perceive the business of affordable housing delivery as an unprofitable one which proves housing development to be profit driven enterprise (Amann and Mundt 2012). They expressed how difficult it is to extract substantial profit in even middle-income targeted projects. Therefore, expecting the private developers to help solve the affordable housing issue was considered unreasonable. Along with the unprofitability, the acceptability of the situation in terms degree of enabling environment, level of satisfaction, and willingness to supply affordable housing is evidently low. From their perspective, an affordable housing to be provided by them can only come in the form of temporary structures or bachelor quarters. Thus, the poor supply can sometimes be attributed to a poor understanding of affordable housing (Tan, Samihah, and Phang 2017). Besides that, in many cases getting approval for construction of temporary structures was also a herculean task. There are no rules pertinent to affordable housing construction or private developers. As said by the developers, the regulations appear to be overarching in character, rather than having a project wise consideration or flexibility. They were hopeful that if the government gets involved and tries to regulate land prices, or enable them through either landuse or financial incentives, then it may begin a new trend.

4.2 Additional findings

Some new findings were revealed through the interviews which cannot directly classified as supply-side constraints. Firstly, the educational level of the developers did make a lot of difference in getting things done smoothly. It helps even more if the developers are of architecture or engineering background as they understand the technicalities of construction procedure better than people from other backgrounds. They shared how they could play with design in trying to go an bit extra in making efficient use of land. They also mentioned that the quality of drawings submitted by them were professional, which was also agreed by the structural engineer in the thromde. Because of this, there is minimal delay in approvals and thus, the job gets done faster for them.

Another important finding revealed is the construction practice culture in Thimphu and Bhutan in general. There is little or no experimentation carried out neither from government nor from the side of the private developers. The construction practice in RCC framed structure with brick partition walls is what has been going on for a long time and has proven to be resilient and

trusted method of construction. Therefore, developers do not wish to take risk with newer materials with fear of it not working out well, irrespective of the structural strength. For structures more than two storeys, the private developers always stick to RCC framed structures which increase the total weight of the structure. However, more weight means more cost. Even during the design of the structures, the engineers only carry out the column and beam analysis and not the slab analysis in Thimphu. According to the structural engineer from thromde, the cost can be lowered to some extent through slab analysis, however it wasn't practiced in the country. The developers said that the construction practice in the country is not mechanized which leads to it becoming time consuming and leads to lot of wastage in material. This ends up adding up unnecessary cost to the construction. Some of them also believe that maintenance of affordable housing would be difficult given greater number of units per building, which means more people which might result in difficulties of management.

4.3 Recommendations

As the research is a small study trying to understand and explain the influence of supply-side constraints on affordable housing delivery for private developers in Thimphu, the results may not be representative of a larger population. Therefore, making bigger policy recommendations based on the findings may still be questionable. However, the research sets a starting point towards exploring many other possible factors influencing the affordable housing delivery which need further investigation. Further research can be expanded on topics including the construction practice culture on housing affordability, building codes influence on housing affordability, and detailed study of housing value chain itself. While carrying out the research, it was also learnt that the data and literature on housing for Thimphu is really poor. It was also difficult to get in contact with the private developers since most of them function informally, with only few formalized established companies. Therefore, the National Housing policy 2019 could address the formalization of developers or formation of developer's association as a steppingstone towards recognizing private developers as the key housing suppliers. With recognition, comes avenues for involvement in decision making. Along with this, data system for housing would be beneficial for the country to understand the actual needs and supply trends.

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Annex 1: Interview Guide for Private Developers

Thesis Topic: “Towards Housing Affordability: Unpacking the influence of supply-side constraints on affordable housing delivery by private developers in Thimphu.”

Main Research Question: How do the supply-side constraints influence the housing value chain towards the delivery of affordable housing by private developers in Thimphu?

Research Objective: To understand and explain the influence of supply-side constraints on affordable housing delivery by private developers.

The questions are basically to guide the interview to get as much information as possible. The questions consist of main questions followed by sub questions in few of them. The interview does not necessarily need to be in the same order as it is written. The interview will be more spontaneous in the sense that some questions may not need to be asked if the interviewee already answers it without being asked, while some questions may be asked earlier or later, and so on. The guide shall help ensure that all indicators necessary are covered in order to extract data that is adequate and relevant.

General Information

Name:

Designation:

Registration (formal or informal):

Composition (Single entity or Organization):

Types of projects and services offered:

Number of years involved in Housing supply:

Target Group:

Number of Housing projects Developed:

Type of Housing projects developed (rental, home ownership, others)

PART 1: HOUSING VALUE CHAIN OF SUPPLY-SIDE

1. What are the pros and cons of housing delivery process in Thimphu?
2. Could you explain which step (land, house construction, basic infrastructure provision) in housing delivery hampers the cost? And why?
3. Does land acquisition process have significant impact on the cost of housing products?
 - a. What is your view on the accessibility of loans for land purchase?
 - b. How long does it take to have the land title?
 - c. What percentage of housing delivery cost amounts to land acquisition?
 - d. To what degree can this step increase or decrease cost of housing delivery?
4. How far do you agree with the process of getting number of governmental approvals (building design, construction compliance, clearances, etc) for house construction and eventually housing delivery?
 - a. How easy is it to get these clearances?
5. What are the kinds of loans available for house construction?
6. In usual practice, approximately what is the percentage of construction material import is involved?
7. In usual practice, approximately what is the percentage of construction labour import is involved?
8. What percentage of housing delivery cost amounts to house construction?

9. How expensive is it provide basic infrastructure during housing delivery (Paving, Drainage, Parking, Sanitation)?
10. Does the government also share some portion of the expense for basic infrastructure provision?
11. To what degree do you think the processes involved in housing delivery are financially motivating to deliver affordable housing?

PART 2: SUPPLY SIDE CONSTRAINTS:

1. How well do you understand and agree with the landuse regulations?
 - a. Do you agree with the prevalent land use regulations (for allowable ground, cover, heights, setbacks, and others?)
 - b. What kind of incentives in terms of landuse are available for developers or for affordable housing development?
2. How well do you understand and agree with the zoning regulations? a. To what extent does the zoning regulation leverage affordable housing supply?
3. Have you participated in formulation of any landuse or zoning regulations? a. Do you think it's necessary?
4. In your experience of housing delivery, is there always proper connectivity to bulk infrastructure like main road network and sewer network? a. Does the absence of such feature have any impact on housing delivery cost?
5. How well do you understand the building code requirements for construction?
 - a. Do you agree with the requirements of construction styles, material requirements, and building standards? If yes/no, why?
6. How flexible are these regulations?
7. What do you feel about the relevancy of the building codes to the context?
8. Do you feel the building codes favor affordable housing delivery? Please share some pros and cons of the prevalent building codes.

PART 3: AFFORDABLE HOUSING DELIVERY

1. What is your perception of affordable housing?
2. What is the trend of affordable housing delivery like in Thimphu?
3. How affordable are your housing products? a. In your housing products, what is the approximate percentage of monthly expenditure on house related expense (rent/loan repayment) from the total monthly household income?

PART 4: DEVELOPER'S PERCEPTION

1. What is your opinion on the profitability of supplying affordable housing products?
 - a. How long does it take to clear loans taken for housing supply?
 - b. How long does it take to sell out the products?
2. What motivates or will motivate affordable housing delivery?
3. How satisfied are you with the current development control regulations?
4. How would you rate the degree of enabling environment for affordable housing delivery in Thimphu?
5. Do you have any other comments to share regarding affordable housing delivery, or anything else you feel is important?
6. Would you like to suggest somethings which can help enhance affordable housing supply?

Annex 2: Interview guide for Urban Economist in MoWHS, Thimphu

General Information

Name:

Designation:

Agency:

Job Description:

SUPPLY SIDE CONSTRAINTS OF HOUSING

1. What is your view on the affordable housing supply in Thimphu?
2. How important do you think can private developers be in the delivery of affordable housing?
3. How are the private developers enabled to venture into affordable housing supply?
4. The delivery/supply of housing is governed by several regulations in each step starting from land identification to final product. How far do these development control regulations consider affordability?
 - a. Are there any land use incentives (coverage, density, others) or flexible regulations for affordable housing projects?
 - b. Do you consider private developer's participation important in framing regulations?
 - c. What mechanisms are in place or are being planned to encourage affordable housing delivery?
5. How well is the connectivity situation of Thimphu in terms of transportation network and sewer network?
 - a. Does presence of connection to bulk infrastructure connection make any difference to housing affordability?
 - b. Does the government bear a portion of basic infrastructure provision cost?
6. In what ways do you think the development control regulations enable or limit the delivery of affordable housing?
7. What is your view on the relevancy of demarcating undevelopable land in areas with slopes more than 30 degree?
8. To what extent do the development control regulation favor the availability of land?
 - a. If yes, what are the mechanisms?
 - b. If no, are there any plans to improve or what can be done?
9. How enabling would you say the whole affordable housing supply environment is for private developers?
10. The National Housing Policy 2019 aims to achieve mass affordable housing. Will it be possible to share how it is going to be approached?
11. Would you like to share any other comments regarding affordable housing supply or anything that you feel is important?

Annex 3: Interview guide for structural engineer in Thimphu Thromde

General Information

Name:

Designation:

Agency:

Job Description:

SUPPLY SIDE CONSTRAINTS OF HOUSING

1. What is your view on the housing affordability supply in Thimphu?
2. What is your view on the general level of understanding of building codes and regulations by private developers?
3. How relevant do you think are the building codes in current time and context?
 - a. Do the building codes consider affordability features?
 - b. After how many years is it revised?
4. Could you share some pros and cons of building codes if any, with regard to affordability.
5. From your experience, how do you think housing affordability can be enhanced through building design?
6. What is the level of flexibility in building design in projects that propose affordable housing?
7. How can developers be encouraged through building codes and standards to take up affordable housing projects?
8. What is your opinion on the relevancy of governmental approvals required for house construction?
 - a. Is it too much, justified or too little?
 - b. How do they enhance or hinder affordable housing supply?
9. Would you like to share any other comments regarding affordable housing supply or anything that you feel is important?

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2. The number of pages for the thesis is about 50.
3. The thesis should be edited

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