Data Final Report

GIS Enabled Property Valuation Model

ICF-SNG-2

(June 2022)

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Acronyms

Sr. #	Abbreviations	Stands For
1.	SNG	Sub National Governance Program
2.	ICF	Innovation Challenge Fund
3.	GIS	Geographic information system
4.	E&T	Excise And Taxation
5.	UIPT	Urban Immovable Property Tax
6.	FCDO	Foreign, Commonwealth and Development Office
7.	KP	Khyber Pakhtunkhwa
8.	IT	Information Technology
9.	ET&NC	Excise And Taxation and Narcotics Control
10.	FAR	Floor Area Ratio
11.	VGI	Volunteered Geo-Information
12.	CGPA	Centre for Governance and Public Accountability
13.	GPS	Global Positioning System
14.	DVL	Draft Value list
15.	FVL	Final Valuation List
16.	BOR	Board of Revenue
17.	CVT	Capital Value Tax
18.	VC	Valuation Committee
19.	GDP	Gross Domestic Product
20.	GoKP	Government of Khyber Pakhtunkhwa
21.	VGI	Volunteered Geo-Information
22.	CAMA	Computer Assisted Mass Appraisal

Executive Summary

ES 1: The FCDO sponsored SNG-II is a four years technical assistance Program that aims to strengthen Pakistan's public financial management and planning system, focusing on resource mobilization and allocation for efficient service delivery. At impact level, the program shall contribute to the high-level objective of helping Pakistan to consolidate its democracy, prioritize economic growth and reduce poverty. The SNG -II initiated a challenge Fund competition (ICF), that seeks to finance innovative and potentially scalable pilot approaches to build evidence of what works to improve governance systems for better service delivery that, in particular, meet the needs of poor and marginalized people in Punjab and Khyber Pakhtunkhwa under SNG.

ES 2: In line with the goals and objectives of the SNG and the ICF, the CGPA proposed a pilot Project that is aimed at enabling the public policy choices in respect of *The Urban Immovable Property Tax* through a GIS based property valuation model by use of effective and robust IT based GIS mapping and data analysis. The theoretical basis of the Pilot is based on the empirical evidence that there is a significant relationship between spatial factors such as locational, physical, environmental, infrastructure characteristics and the value of properties. With the use modern GIS technology, it has become quite practical to examine these spatial variables as model input for valuation exercise for a particular area. In GIS-based assessment, every type of information can be geocoded with an integrated spatial-database which provides robust tools for data auditing, maintenance, updating and analysis in an automated manner that can help reduce time and cost.

However, there are certain challenges as well. Although GIS makes data analysis easier and time efficient but collecting and updating the input data for the analysis can still be difficult and quite a laborious exercise. It still requires substantial labour to digitize the existing attributes of land value and create a composite database.

ES3: To develop an econometric model for property valuation, a pilot project was proposed, that included survey of around 3000 commercial properties in five different rating areas of Peshawar and Kohat. These areas included, Aabdara Road (locality A+), Qissa Khaani Bazaar (Locality A), Warsak Road (Locality C) and Afghan Colony (locality D). In order to make the pilot applicable for other cities as well, a rating area from Kohat commercial center was also included.

The first step in this pilot project was preparation of spatial data, based in departmental maps and digitization of satellite imagery. In the next step, field survey, using a mobile app was conducted to gather property characteristics and prices data.

ES4: In order to identify any additional units not covered in the departmental registers, an effort was made at integration of gathered data with existing GIS-PTIS. This however proved challenging, as not every enlisted property could be identified and vice versa. For the pilot area all properties registered with E&T were requested from the department. Excise and Taxation team provided a total of 32094 properties data. The consulting firm managed to survey a total of 3312 surveys which had a total of 1245 properties whose property id was found on system referred to as integrated properties and 2067 properties whose property id was not found, and new property id was created on system referred to as non-integrated properties

As a next step, analysis was performed to prepare the models for different areas, estimating the property value, based on locational & other spatial factors.

In the last step, the model was developed, and property valuation was generated for pilot areas. Once the model was developed, property value was estimated for the surveyed units.

In order to find the gaps or missing properties in E&T record and to determine the existing taxation demand of the properties, it is important to first know how many and which properties are registered with E&T department. Property Data Provided by excise don't have GPS Coordinates, the unit numbers were not

sequential and unique, property data had divergent formats, making it difficult to find and integrate. Secondly, challenges during the survey, included poor page quality, and unreadable number, resulting in a higher number of non-integrated properties. Moreover, inspectors were overburdened with other administrative tasks, and thus unable to devote adequate time during the survey.

ES 5: The two main measures of value are capital value and annual rental value. When the standard of value is market value, capital value is the price that would be expected in an open-market, arm's-length sale. Where mass appraisal is used for ad valorem property taxation, value definitions should be specified in law. Annual rental value is the expected annual rent (or income). Annual (rental) value can be expressed on a gross or net basis.

The existing system of Property valuation for the imposition of UIPT is based on a formula:
Plot area in Sq yds + covered area in square feet x Locality Factor.

The predicted values for ***Abdara road*** properties matched well against the observed values. The average value/price of sample properties (24) is PKR 57.75 Million whereas the model predicts the average value to be PKR 60 Million. The actual average property tax demand as per the existing rental value for these properties is PKR 169,842/- and this turns out to be 0.28% of the predicted value of sample properties. In case, the property valuation model as proposed was to be adopted by the E&TD, the tax demand would increase the tax to 0.5%, the collection for sample properties can go up from PKR 4m to PKR 7.2m.

Similar analysis for the warsak road properties showed that the average value/price of sample properties (546) is PKR 3.977 Million and the model also predicts the average value to be the same. The actual average demand for these properties was PKR 1,782/- and this turns out to be 0.044% of the predicted value of sample properties. If E&TD were to increase the tax rate to 0.5%, the collection for sample properties can go up from 972,972 to PKR 10.8 Million.

The average value/price of sample properties (166) in the Qissa Khawani Bazaar shows it to be PKR 325.5 Million whereas the model predicts the average value to be PKR 321 Million. The actual average demand for these properties was PKR 5,803/- and this translated into 0.0018% of the predicted value of sample properties. If E&TD were to increase the tax rate to even 0.1%, the collection for sample properties can go up from PKR 963,298 to PKR 53.3 Million. Interestingly, the Qissa Khawani Bazaar is higher than that in the Aabdara road, which has the highest locality factor in the city.

The average value/price of sample properties (166) in the Warsak Road area was found to be PKR 18.8 Million whereas the model predicts the average value to be PKR 17.65 Million. The actual average demand for these properties was PKR 9,406/- and this translates into 0.053% of the predicted value of sample properties. If E&TD were to increase the tax rate to even 0.1%, the collection for sample properties can go up from PKR 874,758 to PKR 8.2 Million.

Moving to a computer assisted valuation framework is the first of its kind in the property tax regimes of the provincial governments in Pakistan. Hitherto, the efforts have been concentrated in digitizing the assessable units. However, piloting the methodology of factoring in spatial and non-spatial characteristics of properties in computer assisted routines makes the province of Khyber Pakhtunkhwa to be pioneer in developing an alternative framework for valuation of urban properties.

ES 6: Even if theoretically the system of property valuation based on spatial and other factors is accepted as a workable model, adopting it for UIPT purposes, poses certain challenges. The key challenge is the *Section 3(2) of the UIPT Act 1958, that states : Subject to the provisions of section 4, there shall be levied, charged and paid a tax, on the basis of annual rental value of buildings and lands in the rating areas (heretofore notified or as may hereafter be notified under this Act).*

Institutionally to adopt the assessed / estimated value based on objective factors, prudence would demand that a ***valuation committee,*** comprising of membership from Board of Revenue (BoR), Regional Tax Office(s) (RTO) and the Excise & Taxation Department can be better placed to validate the values gathered by Assessing Authority. Adopting this system, requires:

1) Defining the policy parameter of target tax rate as as a percentage of the capital/market value of properties and incrementally increasing the tax rate from the base rate to the target tax rate, or alternatively;
2) Calculating the equivalent (effective) locality factor for the base and target tax rates and incrementally increasing the effective locality factors.

However, actual implementation requires more than technical model and the legal framework. Some of the key steps include:

- *Comprehensive stakeholder consultations:* Consensus has to be built across the board with all stakeholders including citizens, excise staff etc as all of them who are likely to be affected by the changes in the system
- *Creating a GIS database of Properties:* The E&TD should also create GIS backend support to have a full database of the properties in the urban areas and bring them under the tax net.
- *Unique identification code:* While building up the GIS database, it would be useful to introduce a unique number which would identify the property. This code could locate the property uniquely in terms of ward, the colony and the block and perhaps floor or flat.
- *Valuation Committee (VC):* The government should appoint a VC consisting of experts and persons experienced in urban administration, taxation, and representatives from the local body.
- *Last but not the least, citizen education and awareness* should be made aware of the reasons for the reforms, what is being planned and the advantages of the new system.

SECTION I
CONTEXT AND THE FRAMEWORK

1. Context

1.1 The Sub National Governance Program (SNG II)

The FCDO sponsored SNG-II Program aims to strengthen Pakistan's public financial management and planning system and to focus on resource mobilization and allocation for efficient service delivery. It is a four-year technical assistance program supporting the governments of Khyber Pakhtunkhwa (KP) and Punjab provinces, as well as local governments, to improve the way they are governed and manage their resources for better service delivery. At impact level, the program shall contribute to the high-level objective of helping Pakistan to consolidate its democracy, prioritize economic growth and reduce poverty. To achieve this, SNG-II will foster the behaviours needed to achieve the following major transformations:

1. Create performance driven culture across the civil service.
2. Enable true fiscal decentralisation on evidence based local needs.
3. Improve fiscal efficiency and revenue collection to fund those needs.
4. Ensure transparency for citizen to hold government to account.

SNG-II explicitly recognizes that reforms must be sustainable and thus this requires the program to look beyond technical solutions, focusing instead on transformations within government.

1.2 The Theory of Change

Following the framework of Theory of change, the SNG II aligns the four transformations with the intermediate outcomes and the outputs. The theory of action captures how SNG-II operates to build acceptance within government and establish the building blocks for long-term sustainability. At the output level, SNG-II works across the following four workstreams to achieve its objectives:

i) Planning and reform, helping improve the way government plans for carrying out its functions so resources are allocated based on need, and helping to get the most efficient and effective government systems and structures in place.

ii) Budgeting and transparency, helping provincial and local governments manage their resources better, including better budget allocation and spending that reflects them, and to become more transparent, making it easier for citizens to hold them to account.

iii) Fiscal space, helping government generate and free up more resources that can be utilized for the delivery of services.

iv) Innovations, piloting and scaling up innovative approaches to improving evidence-based policymaking and planning, governance, and action-oriented research.

The SNG-II program is supporting the Finance Department and the key revenue generating departments, i.e., the *Khyber Pakhtunkhwa Revenue Authority* (KPRA) and the Excise, Taxation and Narcotics Control (ET&NC) Department that collectively manage 83% of the provincial revenue collection, to identify and implement reforms to increase the province's own-source revenues and improve fiscal space for service delivery.

As part of the out IV, ***Innovations, piloting and scaling up innovative*** approaches, the SNG II launched the Innovation Challenge Fund (IFC) round 1, as a competitive process, seeking proposals.

1.3 The Innovation Challenge Fund: (ICF)

The ICF seeks to finance innovative and potentially scalable pilot approaches to build evidence of what works to improve governance systems for better service delivery that, in particular, meet the needs of poor and marginalized people in Punjab and Khyber Pakhtunkhwa under SNG.

1.4 The objective of the ICF

The objective is to fund innovative 'pilots' that will support areas such as public financial management, planning, *revenue mobilization*, delivery of municipal services, accountability and transparency and other areas of reform strongly linked to three technical outputs of the SNG Program that may not be possible through a standard Technical Assistance as it requires additional financial and thinking space.

1.5 The Project:

GIS based Property Valuation:

In line with the goals and objectives of the SNG and the ICF, the overall purpose of the Project is to enable public policy choices in respect of *The Urban Immovable Property Tax* through provision of credible data and property valuation model by use of effective and robust IT based GIS mapping and data analysis.

Specific objectives are:

1. Provide a system of ***evidence based objective indicators*** for levying taxes across a variety of tax potential.
2. To replace the traditional and arbitrary system of property valuation with a ***GIS-based automated valuation model.***
3. Transform ad-hoc based and generic approach for valuation and rating of areas to ***more scientific and systematic methodology.***
4. ***Reduce or eliminate personal bias in determining UIPT*** levies and avoid interface of tax recipients and taxpayers.
5. ***Enhance transparency and build trust*** among citizens on the government processes with respect to UIPT levies.
6. ***Optimize in tax collection***, improved integrity and transparency, reduced tax management and transaction costs.

Scope:

Functional: The scope of the project is limited to a select 4 urban hubs in Peshawar and one in Kohat city. The IT based solution would be geography neutral and an urban hub in any other mutually agreed city. The objective of selecting hubs from the largest city in KP and an intermediate city is to make it useful for other urban areas.

Systematic: Moving from ad-hoc based and generic valuation and rating criteria towards multiplex evidence based objective indicators using scientific and systemic methodologies.

Institutional: The proposed solution will have implications on the institutional mechanisms, primarily regarding the assessment and valuation of commercial urban properties, as part of urban immovable property tax levy. The primary counterpart of the project was the *Directorate of Excise & Taxation*, with overall policy & administrative supervision by the *Department of ET&NC.*

A brief institutional framework with structure and processes has been provided as part of the '*Sustainability Strategy and Scaling Up Plan'*. Physical surveys and supervisory roles will be redefined having implications on institutional structures and mechanisms.

2. GIS Based Property Valuation: The Theoretical Framework

2.1 GIS based Valuation Approach:

Researchers have proved through empirical evidence that there is a significant relationship between spatial factors such as locational, physical, environmental, infrastructure characteristics and the value of properties. With the use modern GIS technology, it has become quite practical to examine these spatial variables as model input for valuation exercise for a particular area. In GIS-based assessment, every type of information can be geocoded with an integrated spatial-database which provides robust tools for data auditing, maintenance, updating and analysis in an automated manner that can help reduce time and cost. Access to better data collection, data modelling and diagnostic tools through an integrated system gives better, faster and more accurate property or land assessments (ESRI 2013). In the instant exercise, spatial econometrics & GIS analytics would be deployed to develop a GIS-based Automated Modeling technique as the basis for property valuation.

Each of the data field would be linked be linked spatial data in the database. Similarly, data on price of the property would also be entered into the database. Once the data is merged spatial analysis will be performed. The merged database would have all the attributes of the location including the coordinates and geometry that define each feature in the database.

Early studies on land value determination usually consider the distance to the central business district as the single important factor (Kau and Sirmans, 1979; McDonald and. Bowman, 1979; McMillen, 1990, among others). Many researchers, afterwards, put lot of emphasis of infrastructure, economic and social variables [Brondino and Silva (1999), Selim (2009), Dizauddin et al. (2013), E. Larsen and P. Blair (2014), Famuyiwa and Babawale (2014), Kemiki (2014), Demetriou (2016)].

Kamali, Hojjat and Rajabi (2008) grouped the variables determining property values into; environmental variables, neighbourhood variables, accessibility (location) variables and property variable. Oyebanji (2003) identifies seven factors that affect property values. These factors are; population (increase or decrease), changes in fashion and taste, institutional factors (these are factors relating to people's culture, religious belief and government action), technological factors, economic factors, location and complementary uses. Ge and Du (2007) opine that property value is an essential aspect of property markets worldwide and determined by a variety of factors and the determination of those factors is a significant part of property valuation. This also includes the economic growth rate and macroeconomic conditions of a country. Certain studies also refer to government regulations such as Floor Area Ratio (FAR), land-use rules and land titling system as contributing factors to land valuation.

Similarly, general economic conditions at macro levels such as income levels, the profitability of business and tax rates, inflation and interest rates are also important factors in determining general level of value at any given point in time (Gallimore, Fletcher and Carter, 1996).

In the essence, property/land value is a multi-dimensional concept that is comprised of a bundle of unique characteristics reflecting not only its location but equally affected by other amenities such as the quality of neighborhood, infrastructure, environment, economy and public policy. So, it varies from place to place and country to country. In order to develop a comprehensive framework, it is important to examine and analyse the set of all these variables to qualify and quantify their relationship viz a viz value of a properties.

The GIS-based Valuation Method requires translating all the above variables into GIS environment with focus on micro-level layer. Each dimension has been represented by a number of indicators and sub-indicators having spatial reference and value.

2.2 The Challenges in the Approach:

There are certain challenges as well. Although GIS makes data analysis easier and time efficient but collecting and updating the input data for the analysis can still be difficult and quite a laborious exercise. It still requires substantial labour to digitize the existing attributes of land value and create a composite database. However, in recent years, the availability of open data and their continuous new releases are becoming more sophisticated, providing advanced datasets such as up-to-date *Volunteered Geo-Information (VGI).* With such data access worldwide, advanced spatial analysis is becoming more and easier and efficient. It is just a matter of time that the spatial data layers would be readily available on various networks with general public access. Recently, the famous property portal has initiated the services namely "property map" for entire Pakistan. With the availability of this dataset, it has now relatively become very easy to shift to GIS based property valuation system. One of the major challenges is that the transactions data is not linked with the spatial data. Even the property website such as zameen.com have separate views for map visualization – plot finder which is not linked with property prices listing data.

More specifically, the proper implementation of the spatial approach for property valuation demands the recognition of spatial effects and their subsequent implications for spatial statistics (Anselin, 1998). Nevertheless, it is possible to account for spatial dependence by including a neighborhood matrix based on adjacency, assigning more weights to the neighboring observations than the distant observations, as nearby observations are more helpful in explaining the variation in prices (Bidanset & Lombart, 2014; Anselin, 1998). Another common phenomenon in spatial modeling is spatial heterogeneity i.e. the effect of spatial dependence doesn't have the same influence on correlations across the study area in addition to the varying price and attributes relationship over the space; this indicates the presence of spatial heterogeneity. As a consequence, models with a local focus are required to obtain consistent estimators, resulting in different regression results for each unique location (Fotheringham et al., 2002). These two problems associated with traditional techniques make local regression methods suitable for property valuation. Local regression method is among the most effective and robust methods that can account for Spatial heterogeneity and Spatial dependence.

2.3 Property Valuation Framework

- Based on the literature review and world best practices, the factors to determine property valuation have been selected.
- Theoretical property valuation framework developed
- Gather / Extract data from other sources

2.4 Property Valuation Model

- The first step in this activity was the preparation of spatial data.
- In the next step, field survey was conducted to gather attribute and prices data.
- Integration of gathered data with existing GIS-PTIS properties was also part of the field survey
- As a next step, analysis was performed to prepare the models for different areas.
- Later, the consulting firm made a presentation of the model to the client for feedback and refinement

2.5 Field Verification of Model

1) In the last step, the model was developed, and property valuation was generated for pilot areas. In this step random field survey will be conducted to test and refine the model.
2) The consulting firm has refined and finalized the model after field survey.

2.6 Survey for Development of Econometric Model

Random properties survey was conducted at 04 areas of Peshawar and 01 area of Kohat. Areas of Peshawar included:

- Warsak road,
- Qissa Khwani Bazar,
- Afghan Colony,
- Abdara Road BRT Station.

CGPA surveyors conducted total of 3312 surveys which had a total of 1245 properties whose property id was found on system referred to as integrated properties and 2067 properties whose property id was not found, and new property id was created on system referred to as non-integrated properties.

The following activities were performed during the assignment:

2.7 Pilot Area Selection

The pilot areas of Abdara road was selected by CGPA initially but it was decided in the meeting that the pilot should include properties from different categories. So rather than single area, four different places were selected from Peshawar. A software was written to extract all commercial point of interest from mapping sites such as Google Map etc in the pilot areas to better understand them.
After discussion with Excise and Taxation Department, the team finalized the pilot area for analysis.

2.8 Getting Data from E&T Department

In order to find the gaps or missing properties in E&T record and to determine the existing taxation demand of the properties, it is important to first know how many and which properties are registered with E&T department. For the pilot area all properties registered with E&T were requested from the department. Excise and Taxation team provided a total of 32094 properties data. Following image shows the sample of data provided:

PROPEI	DEMAND_ID	DEMAND_NO	UNIT_NUMBER	CATEGORY_NAME	PROPERTY_ADDRESS	SQ_YARD	SQ_FEET	MARLA	OCCUPIER	RENTAL_VALUE	TAXABLE
OFFICE	1 412 402	1	1	A1	JAMRUD ROAD TEHKAL				RENTER	2 280 000	Y
OFFICE	1 412 902	2	5	A1	JAMRUD ROAD TEHKAL		1 200		RENTER		Y
OFFICE	1 412 902	2	13	A1	JAMRUD ROAD TEHKAL				RENTER	84 600	Y
OFFICE	1 412 902	2	12	A1	JAMRUD ROAD TEHKAL				RENTER	112 800	Y
OFFICE	1 412 902	2	11	A1	JAMRUD ROAD TEHKAL		1 200		RENTER		Y
OFFICE	1 412 902	2	10	A1	JAMRUD ROAD TEHKAL				RENTER	84 600	Y
OFFICE	1 412 902	2	9	A1	JAMRUD ROAD TEHKAL				RENTER	84 000	Y
OFFICE	1 412 902	2	8	A1	JAMRUD ROAD TEHKAL				RENTER	87 000	Y
OFFICE	1 412 902	2	7	A1	JAMRUD ROAD TEHKAL		1 200		RENTER		Y
OFFICE	1 412 902	2	6	A1	JAMRUD ROAD TEHKAL		1 200		RENTER		Y
OFFICE	1 412 902	2	4	A1	JAMRUD ROAD TEHKAL				RENTER	204 600	Y
OFFICE	1 412 902	2	3	A1	JAMRUD ROAD TEHKAL		1 200		RENTER		Y
OFFICE	1 412 902	2	2	A1	JAMRUD ROAD TEHKAL	949	1 200	31	RENTER		Y
OFFICE	1 415 302	5	19.	A1					RENTER	240 000	Y
SHOP	1 415 302	5	18.-A	A1		12	108	0	RENTER		Y
SHOP	1 415 302	5	17	A1	JAMRUD ROAD TEHKAL		150		RENTER		Y
SHOP	1 415 302	5	16	A1	JAMRUD ROAD TEHKAL	15	135	1	RENTER		Y
MOBILE	1 416 602	6	33.	A1					RENTER		Y
OFFICE	1 416 602	6	28.-A	A1					RENTER	2 400 000	Y
OFFICE	1 416 602	6	32	A1					ZONG		Y
OFFICE	1 416 602	6	31	A1	JAMRUD ROAD TEHKAL				ZONG		Y

As seen from the above data, the address field is not complete so the data can't be integrated automatically to any database. The only option was to integrate the data using the field survey.

2.9 Geo-Tagging and Rolling Out of Survey

After developing a comprehensive form to capture all property related attributes. The next step was to collect that data from the field. An important step was also to match / integrate E&T commercial properties with the properties found in the field survey.

CGPA surveyors conducted a field survey to ensure that the number of properties are adequate to perform analysis. An android application was developed to capture the location, picture and other desired attributes from the field. A web map application was developed to visualize all the data being collected in the field.

SECTION II
THE PILOT PROJECT

3 The Pilot Project

3.1 Mass Valuations and Property Tax policies:

Mass appraisal is the process of valuing a group of properties as of a given date using common data, standardized methods, and statistical testing. Mass appraisal (valuation) is required when many properties need to be valued economically and en-masse for a purpose such as annual property taxation. In addition to defensible and accurate values, fair and effective property taxation also requires programs that ensure all assessable properties are accounted for and that collection programs minimize the non-payment of taxes. In addition, realistically sustainable tax rates that produce meaningful yields are needed. They need to be high enough to justify investment in effective assessment and collection systems, but not so high as to lead to low levels of acceptance and the need for multiple exemptions and discounts.
An effective market value-based property tax system requires the following components:

- Supportive underlying economic, legal, and administrative frameworks
- Accurate property characteristics and market data
- Skilled valuers
- Effective valuation models
- Quality assurance
- Effective management
- Sufficient resources
- Appeals mechanisms
- Transparency.

3.2 Value-Based Systems

The two main measures of value are capital value and annual rental value. When the standard of value is market value, capital value is the price that would be expected in an open-market, arm's-length sale.
Where mass appraisal is used for ad valorem property taxation, value definitions should be specified in law. Annual rental value is the expected annual rent (or income). Annual (rental) value can be expressed on a gross or net basis. On a gross basis, the owner is assumed to be paying all operating expenses; on a net basis, the occupier is assumed to be paying (specified) operating expenses (such as repairs and insurance). Each basis has advantages and disadvantages of a theoretical and practical nature depending on the nature of land tenure patterns and on other features of the property tax system. A country's property tax system can use more than one basis. For example, agricultural property can be taxed on a current-use or soil productivity basis, while urban property is taxed on a market value basis. Indeed, property tax systems combine value and non-value bases and capital and annual value bases. The United Kingdom is an example of the latter; residential property is taxed on a capital-value basis, and nonresidential property is taxed on an annual-value basis.

3.3 Non-Value-Based Systems

The most common non-value property tax systems are those based on land area, building area, or both. Under an area-based property tax system, taxes are determined simply by multiplying a measurement of area by a rate. In general, area-based systems are suitable only as long as revenues are negligible. Area-based systems have the advantage of being simpler to administer, since only property classification information and area measurements are needed. They are easier to implement, because market data do not have to be collected and analyzed. They also are more objective than value-based systems, because area measurements are less contestable than value estimates. On the other hand, area-based property tax systems are quickly perceived to be less fair. Highly desirable properties may pay the same taxes as

undesirable properties. Individual assessments bear little relationship to either ability to pay or benefits received, and this reduces public acceptance. Area-based property taxes are less buoyant than value-based systems, unless frequent adjustments are made to rates.
In a dynamic economy, property values change constantly. Values in one area may increase, whereas those in another may decrease or stabilize, resulting in a redistribution of property value. Only a system requiring current market value acknowledges these changes in market conditions and the distribution of property related wealth. Assessing property at current market value maintains a uniform relationship between actual property values and valuations made for property tax purposes. Also, current market value imposes an objective basis on what otherwise might be perceived as a highly subjective process.
Assuming sufficient market data are available, current market value is criticized primarily on the basis of an ability-to-pay argument. It is often argued that if values are changed frequently or rise rapidly, tax increases will be unpredictable or overly burdensome, especially on those with fixed or limited incomes. From a public policy standpoint, however, if property taxes are a substantial burden then systems in which property taxes increase in response to increasing values can be alleviated through targeted exemptions or other controls that decouple increases in value from increases in tax.

3.3.1 Valuation and taxation principles

Both valuation and taxation need to be visible and transparent and include controls on the incidence and burden of property taxes. The same principles apply when mass appraisal results are used for purposes other than taxation.

3.3.2 Visibility and Transparency

The workings of a property tax system should be visible to taxpayers. This means that the taxes being generated by the system should clearly be tied to the taxing units of government that use this funding source. Overall increases or decreases in property taxes thereby become a function of the changing needs of these units of government (the budget). Mass appraisal values and the general methodology underlying them should be available and explainable. The basis of valuation, including mathematical models and statistics that measure the quality of values, should be readily available.

3.3.3 Property Appraisal versus Property Tax

One of the most common misunderstandings about the property tax, especially in a current-market-value-based system, is the supposition that the tax is strictly value driven. This implies that a 10 percent increase in appraised value must translate into a 10 percent increase in tax. If true, this result may lead to a disincentive to implement mass appraisal-generated values and to infrequent reappraisal.
By appraising property equitably and uniformly and in accordance with legal guidelines, the property tax administrator ultimately is responsible for the distribution of the property tax burden, not the magnitude of the tax. For example, if the market value of bus-stop/BRT station lots doubles, but the value of all other property in the jurisdiction remains constant, these lots will bear a higher proportional share of the total property tax for the jurisdiction and, conversely, other properties will bear a lower proportional tax burden. That is the principle of ad valorem taxation at work. It is possible, if the system is rate-driven, that the increase in value will translate directly into higher taxes, raising the total tax charged, not just the share levied against the bus-stop front lots. In contrast, in a budget-driven system, higher values force rates downward and offset rising assessments. In

In a budget-driven system, it is possible to decrease the rate of property tax with increase in properties' values.

this type of system, increases in the total amount of property tax result only from increases in budgets submitted and approved by taxing jurisdictions. This is the preferred model.

3.3.4 Valuation Data—Sale Prices

The legal framework should facilitate the acquisition of the data needed in assessment and valuation. That is, owners, occupants, and other market participants should be required to disclose necessary details. Mechanisms for sharing information between governmental agencies receiving or managing information should promote this process. Similarly, if high transfer or other taxes discourage reporting of correct prices, alternate verification systems may be needed. Ultimately, the accuracy of reported sales prices is inherent to the quality and acceptability of assessed values, provided sale price is the basis for value. Deterrents to registering ownership or occupancy changes or to disclosing actual prices should be eliminated. If accuracy of sale prices remains in question, alternate data, such as asking prices, may be considered.
In the current pilot, one of the confounding factors was the non-availability of transaction data. Two reasons provide explanation: transaction

3.4 Automated Valuations and Property Tax Reforms

Tax reforms are not easy to gain traction and have its own inertia. No matter how economically desirable the long run outcome of property tax reform may be in terms of the equity and efficiency of the tax, the costs and benefits of any reform are likely to be unevenly distributed (Blöchliger and Vammalle 2012). There are always winners and losers from tax reform: those who were relatively over-taxed before the reform was implemented will pay less in taxes; those who were relatively under-taxed before the reform will pay more. As behavioural economics implies, the losers from a change in policy tend to be very vocal (even if they are the minority) because they value their losses more than the winners (even if they are the majority) value their gains. The public perception is that in general tax reform is not revenue neutral – a perception which, at least in the cases where the goal of reform is to increase revenues, is often correct.
With a visible tax such as the property tax, increasing the tax on some taxpayers (particularly on politically influential) is never easy. Furthermore, where the losses are concentrated and the gains are dispersed, as is often the case with tax reform, negatively affected interests will be motivated to spend time and resources in political action that can result in permanent, institutionalized groups (for example, owners of commercial plazas) in opposition to reform. Winners, on the other hand, are often not even aware of the potential gains from reform (Blöchliger and Vammalle 2012). The fact that the costs of reform tend to be apparent immediately but most of the benefits emerge only later does not help.
Since property tax reform is expected to result in major tax shifts within or among property classes, some form of phase-in mechanism is almost invariably politically necessary to cushion the impact, at least in the short run (Blöchliger and Vammalle 2012). However, there is an obvious conflict between moving to a fairer system as quickly as possible and lessening the impact on those whose taxes would increase. Existing inequities should not be perpetuated; on the other hand, it is not wise to create undue hardship by moving too fast.

Much evidence across North America shows that assessment limits often look like a quick, attractive ‘fix’ to the political problems that may arise when there is volatility in market value assessment (Haveman and Sexton 2008). The classic example of capping assessments and property taxes was Proposition 13, passed in California in 1978. Under Proposition 13, property tax rates cannot exceed 1 per cent of the property’s market value and valuations cannot grow by more than 2 per cent per year unless the property is sold (this provision is known as time-of-sale reassessment).
Tax caps and assessment limits privilege stability as the most important feature of a good local tax over equity, efficiency, administration, and even taxpayer understanding. A better way to address hardships that

arise from market value assessment is through such generalized property tax relief measures as property tax credits and deferrals (such as the deferrals recently introduced in Ireland). Another approach sometimes mentioned is to attempt to deal more adequately with liquidity problems arising from property tax increases by creating more payment options for taxpayers such as more frequent payments (staggered over the year), the use of digital/online channels of payments and perhaps even billing it on monthly basis with utility bills.

3.5 The Problem

3.5.1 Accuracy of Property Valuations

Property Valuation is one of the key functions of Government Departments, for a number of purposes, especially urban property taxation, stamp duty, sales tax and acquisition etc.
One of the universal and periodic assessment is needed for the purposes of urban immovable property tax (UIPT). The current system of Property Valuation under the Urban Immovable Property Tax Act of 1958 is based on 'Assessment of Rental Value', that is determined at 'block / area level' after a periodic survey of rental values and is not property specific.
The consequence of this methodology is that in order to keep an average assessment, some of the properties are under-valued, while others are over-valued. However, in order to avoid public outcry most of the units are under-valued, resulting in significant loss of revenue for the public. In addition, the system remains non transparent and unequitable.

3.6 The Concept

3.6.1 Data & Technology Driven Valuation

The concept of GIS based valuation is based on identifying the factors that determine the value of a property. Once these factors are determined, using GIS and Information Technology, the mass valuation of an area could be made possible, using these data sets. Based on these data sets, we can objectively determine the value of each property unit, using data analytics.

3.7 Developing the Model

The Project included survey in identified pilot areas. These areas were selected in Peshawar and Kohat. Within the city of Peshawar, four different areas were selected, one each from four different categories of rating areas, to make a representative sample. The fifth area was selected from an intermediate city of Kohat, as Peshawar being the capital, does not represent all urban areas of the province. Each selected area was small enough to be surveyed, while large enough to be representative for scale up.
Data collection of various indicators of property value was carried out based on field survey, using survey form (annexed) and a mobile app. The property values of the surveyed units have been carried out using econometric models (Detailed methodology annexed) to assess property values.

3.7.1 Methodology

3.7.2 Data Cleaning

Extensive data cleaning to identify erroneous records or outliers.
Extensive filtering

3.7.3 Model Selection:

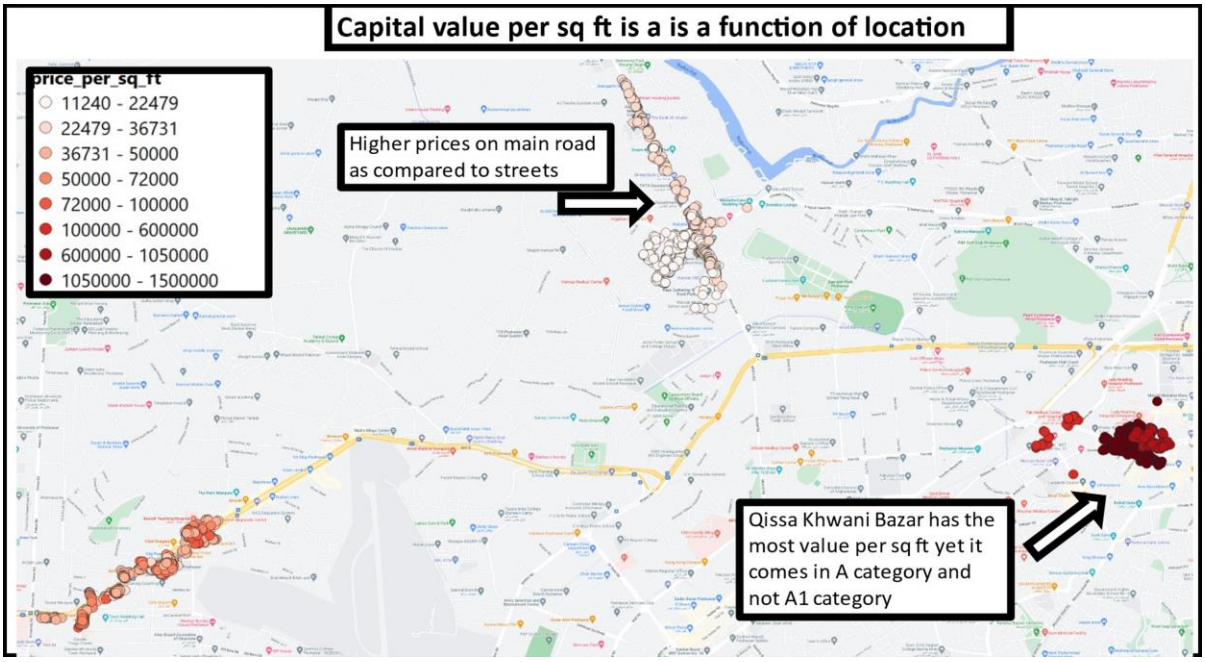
From kitchen sink to parsimonious model
Identifying most influential determinants of valuation
Differ by locale

3.7.4 Estimating property tax rates

Converting valuations into taxes, reviewing tax rates

3.7.5 Lessons and recommendations

One size doesn't fit all
Model outputs to be verified manually or through algorithms to ensure realism



3.8 Modelling Approaches

3.8.1 The Kitchen Sink Approach

- Throw all relevant variables in the model
- Many explanatory variables
- Data collection burden is large

3.8.2 The Parsimonious Approach

- Find the subset of most influential subset of explanatory variables
- Use a statistical modelling approach to select the subset rather than using an ad hoc approach
- Stepwise regression method could be a starting point

3.9 Valuation to Taxes: (Using observed Valuations)

3.9.1 The current system of valuation

The existing system of Property valuation for the imposition of UIPT is based on a formula:
Plot area in Sq yds + covered area in square feet x Locality Factor.

Locality/ Category	Ground Floor	Basement	Ist Floor	2nd Floor	3rd Floor	4rth Floor	5th Floor	All other Floors beyond 5th Floor
A1	20	18	18	16	14	12	10	8
A	15	13	13	11	9	7	5	5
B	10	8	8	7	6	5	5	5
C	7	5	5	5	5	5	5	5
D	5	5	5	5	5	5	5	5

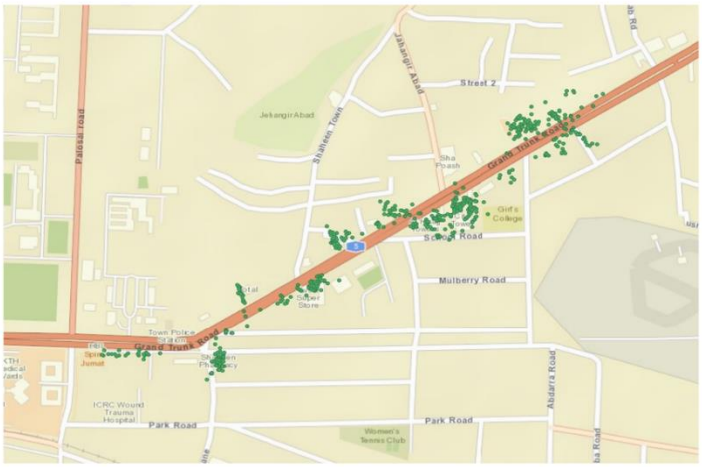
4. Results:

4.1 Properties surveyed along Abdara road:

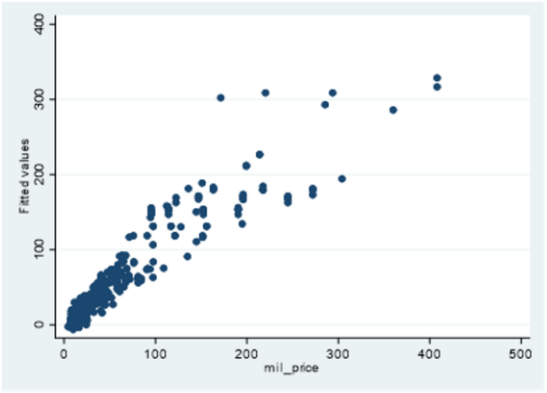
The figure below shows the predicted values for Abdara road properties against the observed values. Overall, it is a good fit which indicates that the model predicts the values reasonably well. The average value/price of sample properties (24) is PKR 57.75 Million whereas the model predicts the average value to be PKR 60 Million. The actual average demand for these properties was PKR 169,842/- and this turns out to be 0.28% of the predicted value of sample properties. If E&TD were to increase the tax rate to 0.5%, the collection for sample properties can go up from PKR 4 Million to PKR 7.2 Million.

17

Abdara Road



Abdara Road, fitted and survey prices



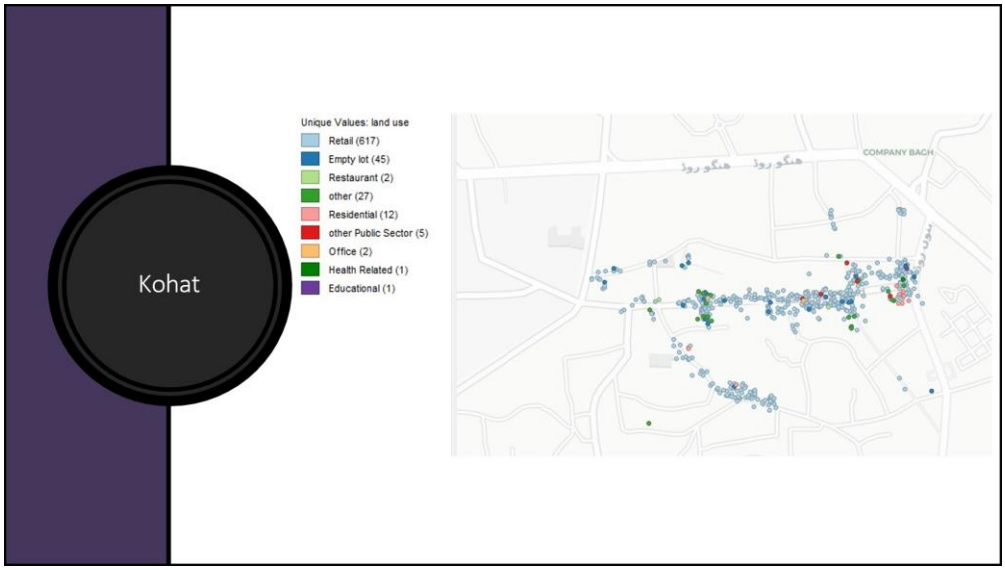
Tax rates (Abdara, subsample 24 properties)

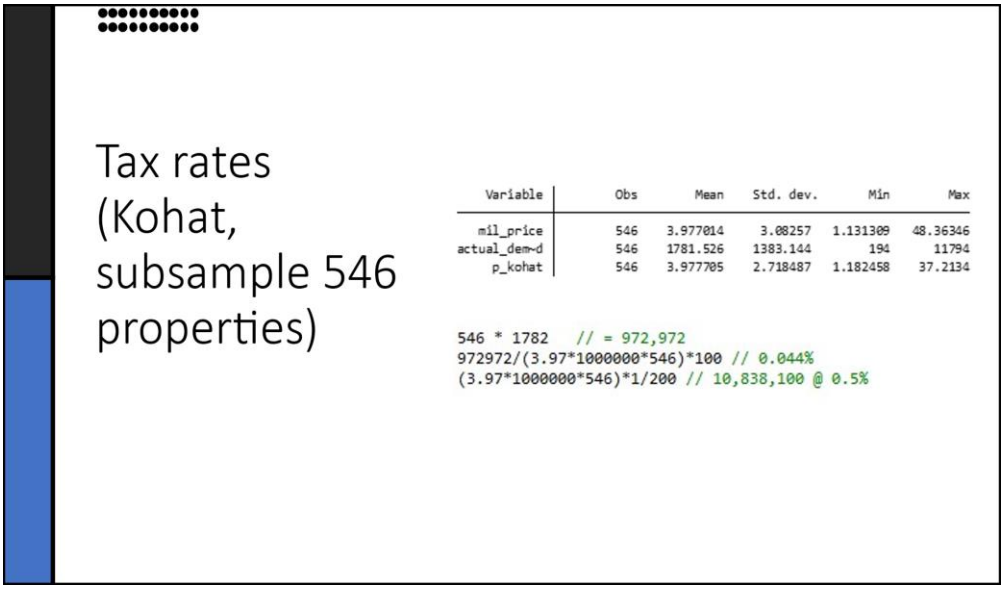
Variable	Obs	Mean	Std. dev.	Min	Max
mil_price	24	57.75012	63.84541	9.297486	217.6
actual_dem~d	24	169842.3	253603	2592	1025157
p_abdara	24	60.54468	63.15103	1.647822	179.4277

```
24 * 169842.3   // = 4,076,216
4076216/(60.54*1000000*24)*100 // 0.28%
(60.54*1000000*24)*1/200 // 7,264,800 @ 0.5%
```

4.2 Properties surveyed in Kohat

The average value/price of sample properties (546) is PKR 3.977 Million and the model also predicts the average value to be the same. The actual average demand for these properties was PKR 1,782/- and this turns out to be 0.044% of the predicted value of sample properties. If E&TD were to increase the tax rate to 0.5%, the collection for sample properties can go up from 972,972 to PKR 10.8 Million.

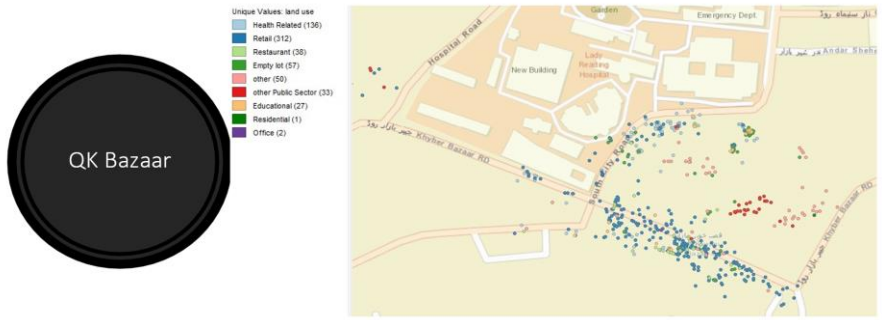




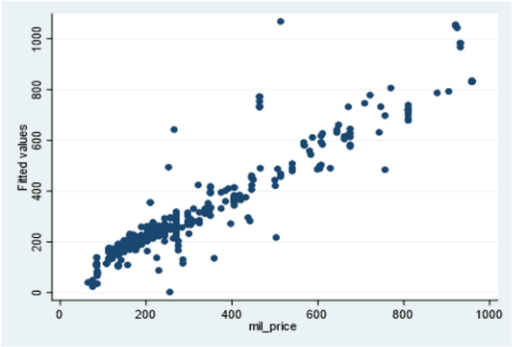
4.3 Properties surveyed in Qissa Khwani Bazar

The figure below shows the predicted values for Qissa Khwani Bazar properties against the observed values. Overall, it is a good fit which indicates that the model predicts the values reasonably well. The average value/price of sample properties (166) is PKR 325.5 Million whereas the model predicts the average value to be PKR 321 Million. The actual average demand for these properties was PKR 5,803/- and this translated into 0.0018% of the predicted value of sample properties. If E&TD were to increase the tax rate to even 0.1%, the collection for sample properties can go up from PKR 963,298 to PKR 53.3 Million.

QK Bazaar



QK Bazaar, fitted and survey prices



Tax rates (QK Bazaar, subsample 166 properties)

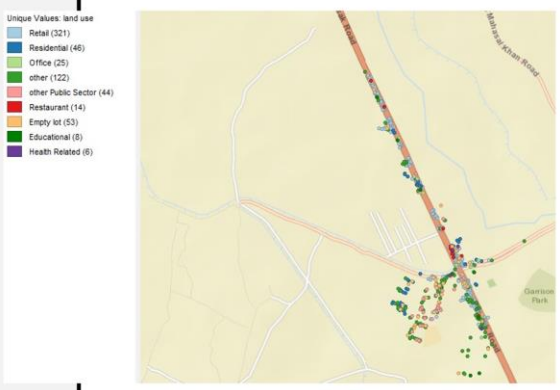
Variable	Obs	Mean	Std. dev.	Min	Max
mil_price	166	325.5063	196.6112	121.5	931.5
actual_dem~d	166	5802.651	15217.54	810	184680
p_qk	166	321.1128	186.6549	2.453787	1068.691

```
166 * 5803   // = 963,298
963298/(321*1000000*166)*100 // 0.0018%
(321*1000000*166)*1/1000 // 53,286,000 @ 0.1%
```

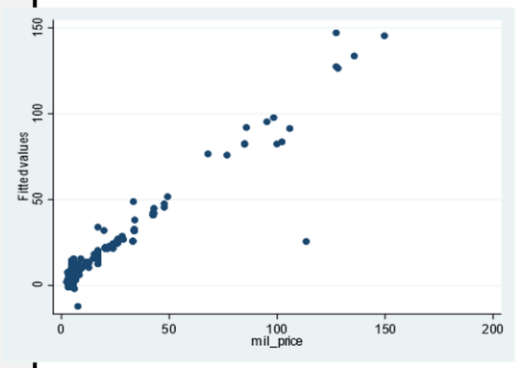
4.4 Properties surveyed on Warsak Road

The figure below shows the predicted values for Warsak road properties against the observed values. Overall, it is a good fit which indicates that the model predicts the values reasonably well. The average value/price of sample properties (166) is PKR 18.8 Million whereas the model predicts the average value to be PKR 17.65 Million. The actual average demand for these properties was PKR 9,406/- and this translates into 0.053% of the predicted value of sample properties. If E&TD were to increase the tax rate to even 0.1%, the collection for sample properties can go up from PKR 874,758 to PKR 8.2 Million.

Warsak Rd.



Warsak Rd., fitted and survey prices



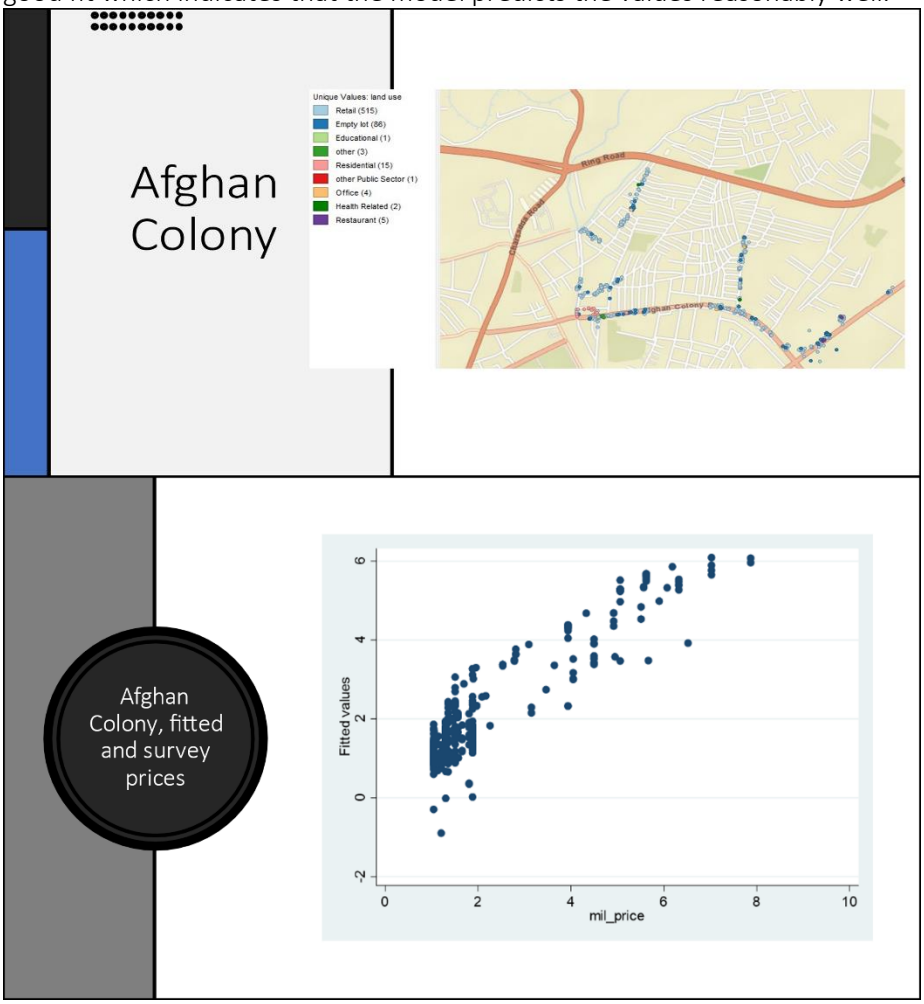
Tax rates (Warsak Rd., subsample 166 properties)

Variable	Obs	Mean	Std. dev.	Min	Max
mil_price	93	18.81291	31.00958	2.832386	149.6744
actual_dem~d	93	9406.065	33979.47	648	304776
p_warsak	93	17.65808	30.05494	-.8404522	147.0769

```
93 * 9406   // = 874,758
874758/(17.65*1000000*93)*100 // 0.053%
(17.65*1000000*93)*1/200 // 8.207,250 @0.5%
```

4.5 Properties surveyed in Afghan Colony

The figure below shows the predicted values for Afghan Colony properties against the observed values. Overall, it is a good fit which indicates that the model predicts the values reasonably well.



SECTION III
DATA INTEGRATION REPORT

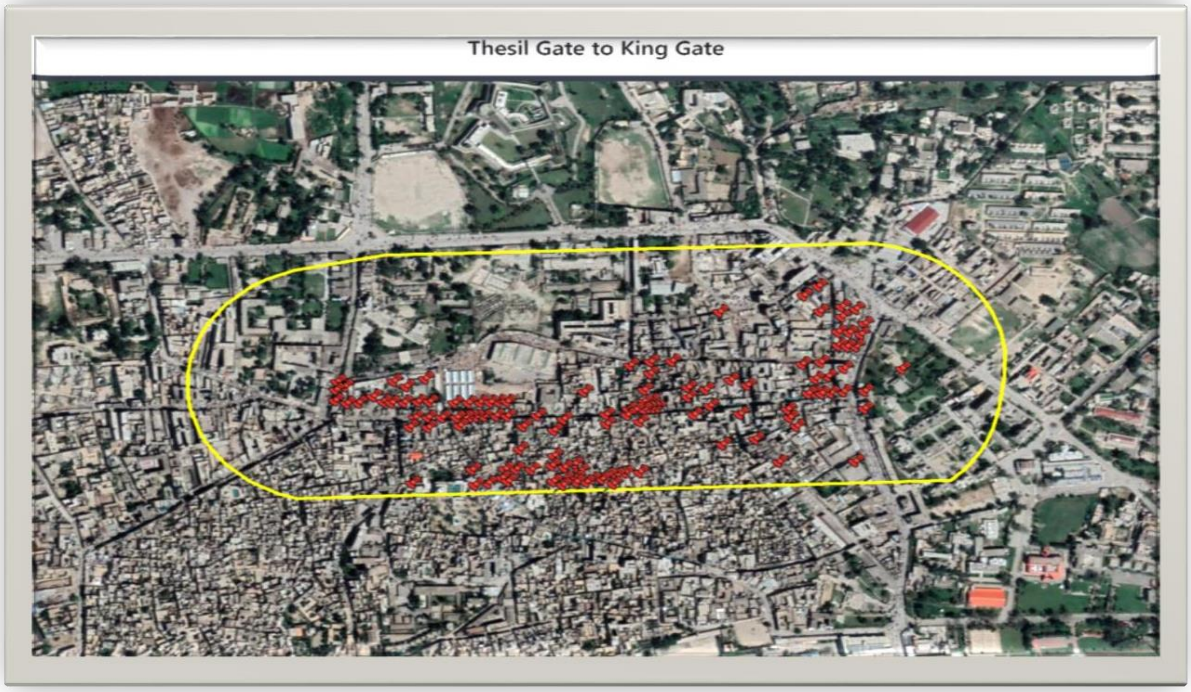
5 Integration Report

Random properties survey was conducted at four areas of Peshawar and one area of Kohat. The total number of surveys to be conducted was 3000. *StepNex* surveyors completed 3312 surveys, with 1245 properties whose property id was found on the system referred to as integrated properties and 2067 properties whose property id (as per computerized record of the Excise and Taxation Department provided for the area) was not found, and a new property id was created on the system referred to as non- integrated properties.
The table below depicts survey progress by area:

5.1 Thesil Gate to King Gate (Kohat)

Total number of surveys to be conducted at Tehsil Gate to King Gate were 600. Stepnex surveyors conducted 716 surveys which included 690 integrated and 26 non-integrated properties. In this area, inspectors were cooperative and on-time so the survey went smooth.

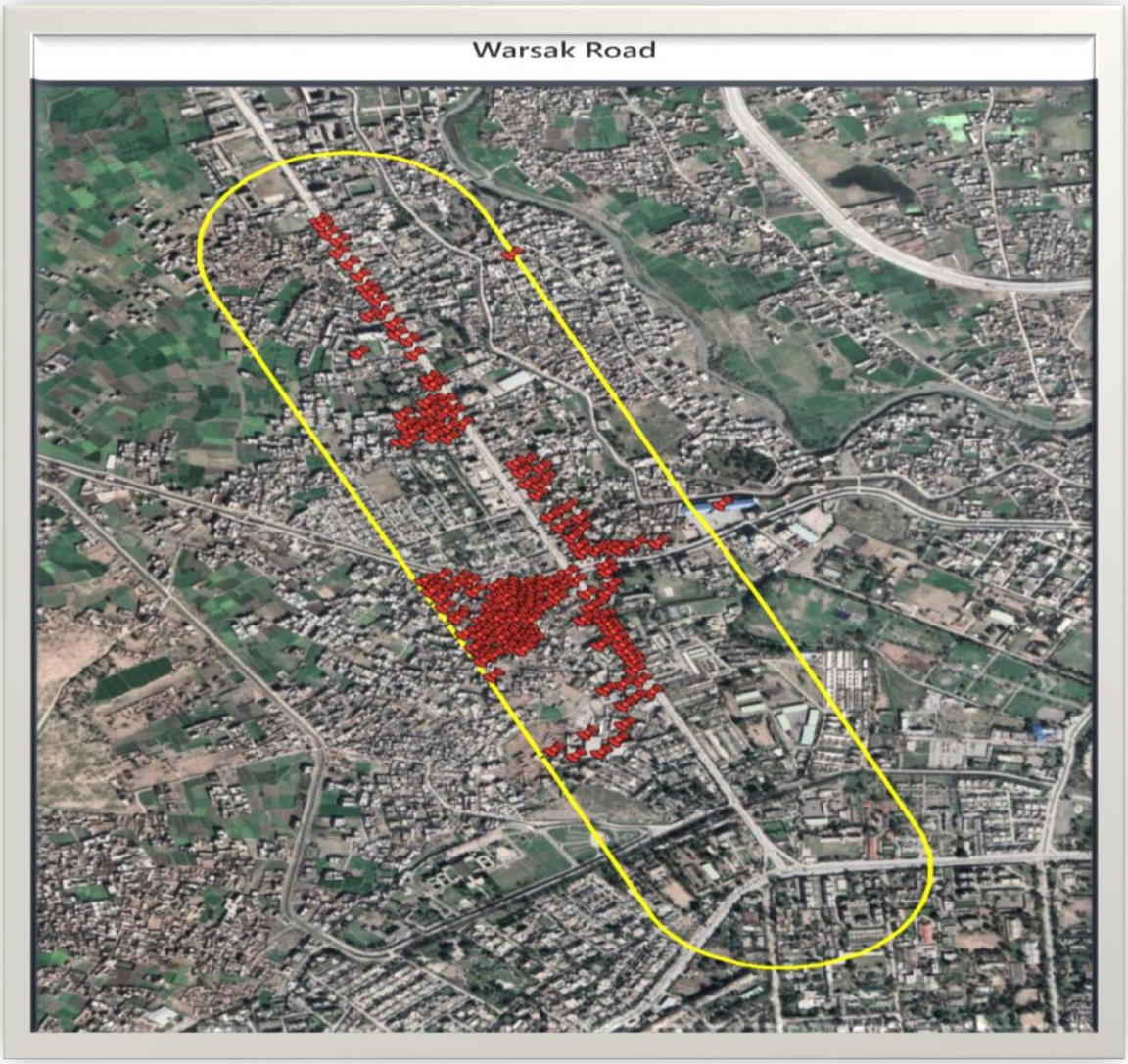
Survey Completed	Integrated Properties	Non-Integrated Properties
716	690	26



5.2 Warsak Road (Peshawar)

Total number of surveys to be conducted at Warsak Road were 600. Stepnex surveyors conducted 657 surveys which included 227 integrated and 430 non-integrated properties. In this area, inspectors were non-cooperative and not on-time so the survey didn't went smooth which resulted in more non-integrated properties.

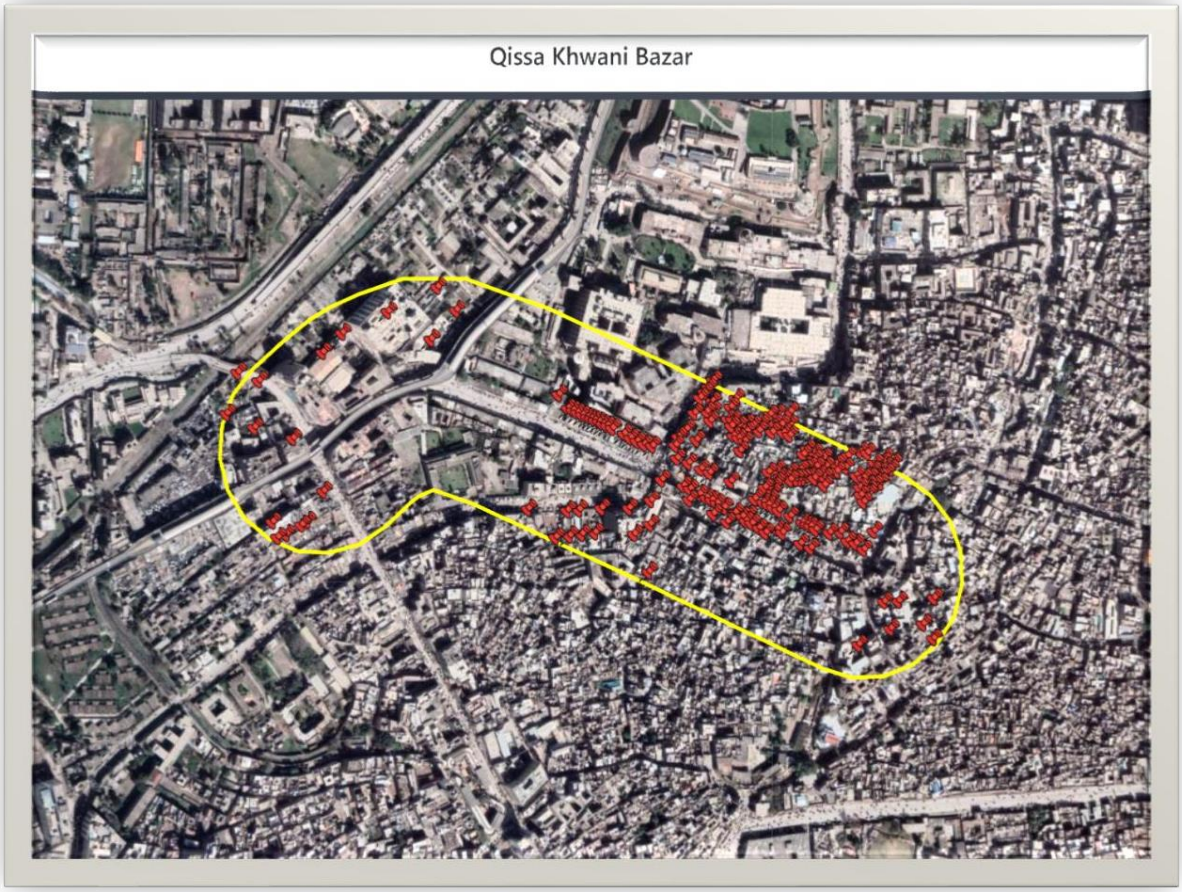
Survey Completed	Integrated Properties	Non-Integrated Properties
657	227	430



5.3 Qissa Khwani Bazar (Peshawar)

Total number of surveys to be conducted at Qissa Khwani Bazar were 600. Stepnex surveyors conducted 662 surveys which included 447 integrated and 215 non-integrated properties. In this area, inspectors were non-cooperative and not on-time so the survey didn't went smooth which resulted in more non-integrated properties.

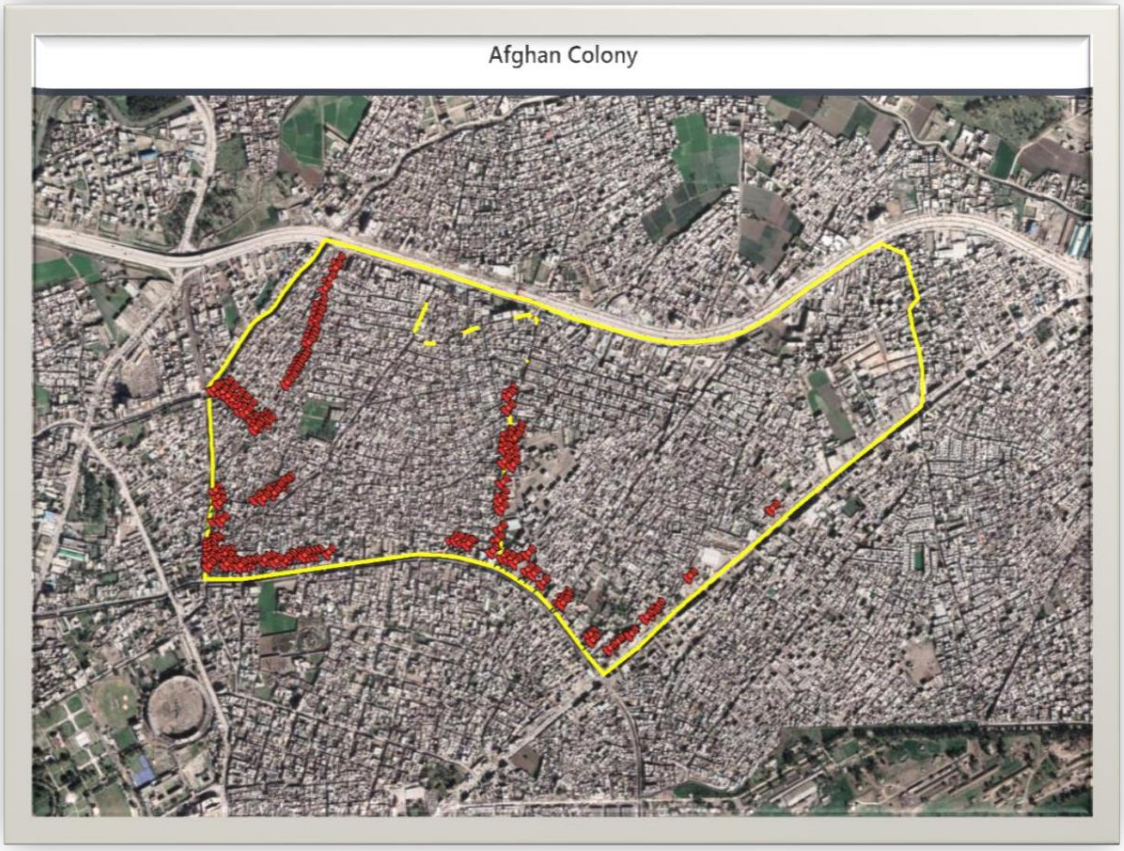
Survey Completed	Integrated Properties	Non-Integrated Properties
662	447	215



5.4 Afghan Colony (Peshawar)

Total number of surveys to be conducted at Afghan Colony were 600. Stepnex surveyors conducted 634 surveys which had 256 Integrated and 378 non-integrated properties. Inspectors were cooperative and punctual in this region, but the data was erroneous, resulting in all non-integrated properties. As a result, the survey did not go smoothly.

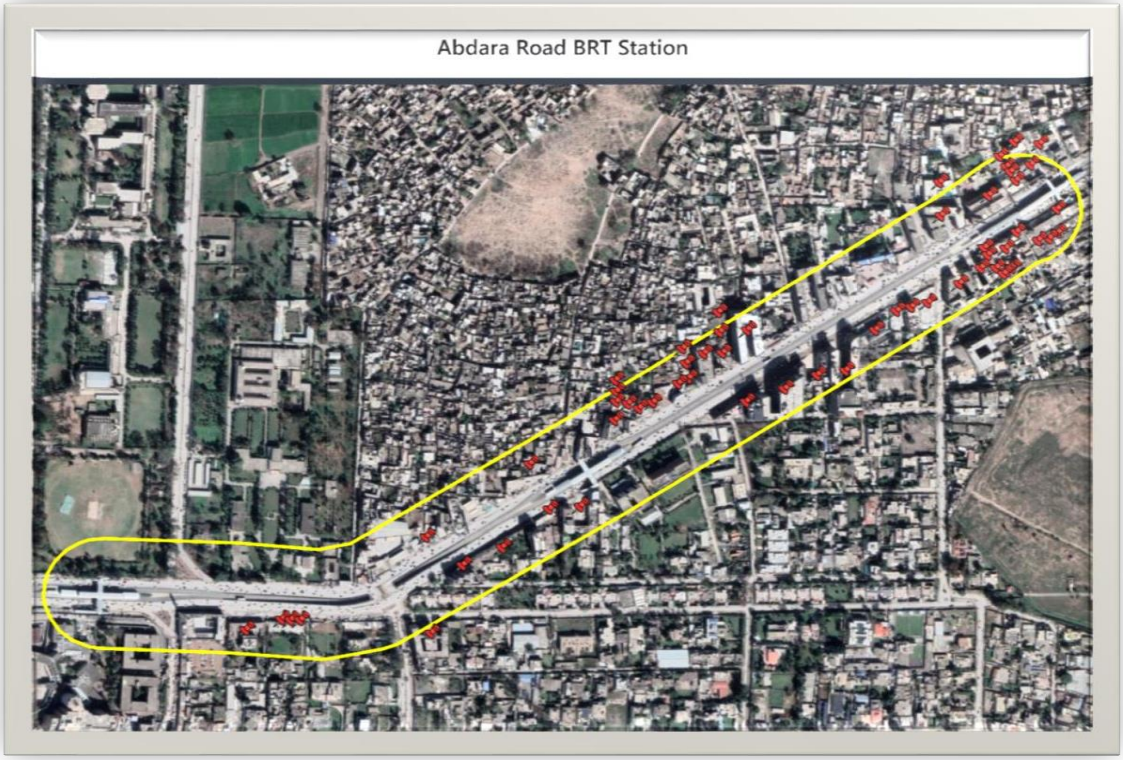
Survey Completed	Integrated Properties	Non-Integrated Properties
634	256	378



5.5 Abdara Road BRT Station (Peshawar)

Total number of surveys to be conducted at Abdara Road BRT Station were 600. Stepnex surveyors conducted 632 surveys which included 254 integrated and 378 non-integrated properties. In this area, inspectors were non-cooperative and not on-time so the survey didn't go smooth, resulting in more non-integrated properties.

Survey Completed	Integrated Properties	Non-Integrated Properties
632	254	378



5.6 Integration Challenges

- Property Data Provided by excise don't have GPS Coordinates. Identifying Property location was a major challenge.
- The unit numbers were not sequential and unique. As a result, some units were not integrated.
- Property data had divergent formats, making it difficult to find and integrate.
- Inspectors had poor page quality, and the writing on the pages was unreadable, resulting in a higher number of non-integrated properties.
- Inspectors were overburden with other administrative tasks, and thus unable to devote adequate time.
- Property number was not mentioned on some records which the inspector had.

SECTION IV
WAY FORWARD: POLICY & INSTITUTIONAL SETUP

6 Way Forward - Policy and Institutional Setup

6.1 Valuation framework – a policy perspective

Moving to a computer assisted valuation framework is the first of its kind in the property tax regimes of the provincial governments in Pakistan. Hitherto, the efforts have been concentrated in digitizing the assesseable units. However, piloting the methodology of factoring in spatial and non-spatial characteristics of properties in computer assisted routines makes the province of Khyber Pakhtunkhwa to be pioneer in developing an alternative framework for valuation of urban properties.

Looking at global experiences, different counties have adopted distinct valuation and taxation parameters. For example, in the U.S. most local communities tax real property—i.e., land and improvements—at a single rate. However, a few communities, notably in Pennsylvania, have experimented with splitting this rate into two components, levying one rate on the value of the land and another on the value of improvements (Hartzok 1997; Oates and Schwab 1997). Typically, the tax rate on the value of the land is set higher than that on improvements.

Examples of differential rating can be found in a number of other countries also. Property rates in Singapore are based on the rental value of properties and a lower rate is charged for owneroccupied properties. Australia imposes a land tax with tax rates varying in accordance with the assessed value of land. Canada's property tax system is based on the assessed capital value of properties and the tax rates may vary with different classes of properties. The UK imposes a council tax on residential properties based on the assessed capital value with properties separated into valuation bands. The council tax is levied at a fixed amount for each valuation band and higher amounts are levied on higher bands.

In the state of West Bengal, valuation of Urban Local Bodies (ULB) takes place in every five years. The statutory body of a West Bengal Valuation Board (WBVB) is mandated to carryout valuation of urban properties for municipal taxation purpose. The following process is followed:

1. ULB adopts a resolution to re-value properties in its jurisdiction and intimates the Department of Municipal Affairs.
2. The State Government in Municipal Affairs Department notifies the area(s) where the Board will commence work.
3. The WBVB issues a public notice, asking the rate payers to file a statement relating to their properties within 30 days from the date of publication of such notice. The notice is published in two newspapers of which one is in the vernacular.
4. Simultaneously, WBVB obtains from the ULB , the municipal maps showing the wards, streets, important places etc. along with the total number of holdings (ward-wise), as also a list of technically qualified Field Assistants (two for each ward) who are engaged by the ULB.
5. These field personnel are imparted detailed training (theoretical as well as practical) by the Board's officers at the ULB level, for three days, on the following:-

1. Measurement of a holding, including land and building.
2. Recording the name of user, building type and nature of use as also rent particulars and period of tenancy, etc.
3. Writing of field books with various items
4. Writing of Inspection Book (ward wise /street wise) and also input sheets

Thereafter the door to door field work begins and depending on the size of the ULB, the entire exercise has to be coordinated over an appropriate period. Field Officers and Valuation Officers of the WBVB thoroughly supervise the work. All the field papers are received by the WBVB headquarters after completion of field reports.

Meanwhile, a policy-level meeting is held with the Chairperson of the ULB, WBVB officials and the Member Secretary of the Board, taking into consideration the income and expenditure statement for the last two

years of the ULB. Parameters such as zone, land prices, nature of use and type of structures etc. are also discussed. Chairperson of the ULB is also requested to express his/her projected annual demand of Property tax.

Once the field data have been collected, very often a lengthy process, scoring and weightage allocation are done using the data collected, and on the basis of the policy decisions relating to the degree of increase in incidence of tax, inter-area parity, general and special holdings, etc. This work is first done manually and then the data is fed into computer. ***All calculations are based on special software***. Following this, a trial valuation list is generated in-house and on the basis of this another round of discussion is held with the ULB at the WBVB office, to ensure that errors have not crept in.

Then the Draft Valuation List (DVL) is prepared containing the proposed annual valuation and property tax for each holding of the ULB and after the signature of the Chairman, WBVB it is published. This notification is published in two newspapers by the Board one of which is a vernacular. The Board also issues valuation notices to each individual rate payers whose names are included in the DVL mentioning that the Objection petition, if any shall have to be filed by the respective rate payer either to the WBVB office or to the concerned ULB within two months of receiving the notice. After receiving the objection petitions from the rate payers within the stipulated time, the objections are heard and disposed by the Objection Hearing Officers (OHOs) specified by the WBVB. The Objection Hearing Officers hear and dispose of the objection petitions in the manner specified by the law. Thereafter incorporating the changes on the valuation as determined by the Objection Hearing officers in the Order Sheets, the Draft Valuation List is modified accordingly and the Final Valuation List (FVL) is prepared. Final Valuation List (FVL) is published by the WBVB in two newspapers, one of which is the vernacular. It is handed over to the ULB which becomes the assessment list of the ULB concerned for the next five years with effect from of its effect.

In Hong Kong, the Rating and Valuation Department (the Department) of the Hong Kong Special Administrative Region Government is responsible for the assessment, collection and administration of rates.[1] The rating system is based on annual rental values and a single percentage rate is charged. Revaluations are conducted on annual basis and rates are primarily a tax on occupation of a tenement.[2] The Rating Ordinance provides that the owner and occupier of a tenement shall both be liable for payment of the rates, but clarifies that it is deemed to be an occupier's liability, and, in the absence of any agreement to the contrary, shall be paid by the occupier. Rates are payable *advalorem* at a percentage of the rateable value for each tenement included in the valuation list and such percentage is prescribed by resolution of the Legislative Council. The current rate is set at 5%.

6.2 Mapping the existing processes with the requirements of the new valuation framework

The West Pakistan Urban Immoveable Property Tax Rules, 1958 (hereinafter referred to as the Rules) in conjunction with Khyber Pakhtunkhwa Urban Immoveable Property Tax Act, 1958 (hereinafter referred to as the Act) stipulate the legislative basis for levy, collection and administration of urban immoveable property tax. While the tax rates are given in the Act, the Rules elaborate the institutional arrangement for administration of the property tax.

Introduction of the new valuation framework would not only require amendments in the charging sections of the Act, but also necessitate recalibration of the institutional arrangements.

[1] Refer to the provisions of the Rating Ordinance, Cap. 116:
<Property Rates in Hong Kong (3rd Edition) (rvd.gov.hk)>

[2] Section 2 of the Rating Ordinance defines tenement as, ""any land (including land covered with water) or any building, structure, or part thereof which is held or occupied as a distinct or separate tenancy or holding or under any licence"

The current basis of taxation is the annual rental value. The structural change of adopting capital value of land and buildings would require an amendment in the UIPT Act of 1958.

> ***Section 3(2) of the UIPT Act 1958:*** *Subject to the provisions of section 4, there shall be levied, charged and paid a tax, on the basis of* ***annual rental value*** *of buildings and lands in the rating areas (heretoforce notified or as may hereafter be notified under this Act).-*

Likewise, there may be a need to redefine the roles and responsibilities of assessing authority. Under the existing Rules, the District Excise and Taxation Officer is designated as the Assessing Authority and is empowered to ascertain the rental values for properties in a rental area. During the process of valuation, the Assessing Authority is empowered to acquire information relating to sale, ownership and measurement of properties from; 1) any revenue authority responsible for keeping the land record; 2) the sub-registrar responsible for maintaining records of registration of sale deeds of lands and building and; 3) any local authority or urban development authority.[3] Notwithstanding, the provision of acquiring third party information sharing, the mechanism is not institutionalized. A more formal structure that reduces the information asymmetry may be desireable. Record related to sale/resale of properties is maintained by Board of Revenue (BoR) and its offices – office of land records and registrars. This record only reflects the sale value, though not necessarily the transactional value of the properties. There is an incentive to under-declare the sale value to save on transaction based charges – stamp duty, Capital Value Tax (CVT), transfer fee. A richer information is available in records of FBR in the form of annual wealth statements submitted as integral part of annual income tax returns. These wealth statement submitted by a filer records the assets at their cost of acquisition and also keeps track of the changes in assets. There is an incentive to record the sale of property at a higher (transactional) value as this provides the filer with a legal basis for high cash inflows. Likewise, the income tax returns possess information about the rental income as well. Thus, there is a strong incentive compatibility in triangulating the disparate information maintained by different entities.

A ***valuation committee,*** comprising of membership from Board of Revenue (BoR), Regional Tax Office(s) (RTO) and the Excise & Taxation Department can be better placed to validate the values gathered by Assessing Authority.

- Maintains its record of rental values of properties
- Has a richer local knowledge
- Records of FBR - annual wealth statements submitted as integral part of annual income tax returns is another source document
- These wealth statement submitted by a filer records the assets at their cost of acquisition and also keeps track of the changes in assets.
- There is an incentive to record the sale of property at a higher (transactional) value as this provides the filer with a legal basis for high cash inflows.
- Likewise, the income tax returns possess information about the rental income as well
- Record related to sale/resale of properties is maintained by Board of Revenue (BoR) and its offices – office of land records and registrars.
- This record only reflects the sale value and not necessarily the transactional value of the properties.
- There is an incentive to under-declare the sale value to save on transaction based charges – stamp duty, Capital Value Tax (CVT), transfer fee

The spatial and non-spatial information regarding the properties gathered by the Assessing Authority (or the subordinate officials) will be entered into the Rental Information System. The rental information will be

[3] Rule 3(2)(bb) of West Pakistan Urban Immoveable Property Tax Rules, 1958

scrutinized and rents which are substantially below or above market levels, will be excluded from the analysis as outlier.

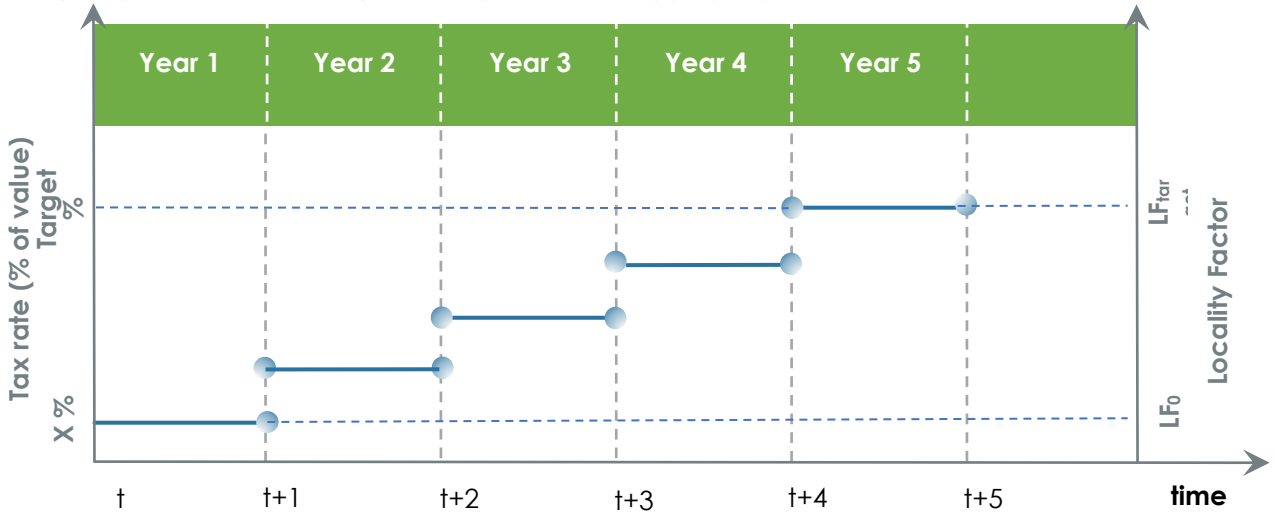
Using regression models, new assessable values will be generated. These provisional assessments will be scrutinized and verified by the Assessing Authority and brought before the valuation committee. The valuation committee will validate the assessable values and finalize categorization of properties into zones. This will result in preparation of draft valuation list. After disposing off the objections, a final valuation list will be prepared.

6.3 Implementation modalities

Since adopting a capital/market value of properties as a basis of taxation would be a structural change, a phased approach is recommended. This can have two variants:

3) Defining the policy parameter of target tax rate as as a percentage of the capital/market value of properties and incrementally increasing the tax rate from the base rate to the target tax rate, or alternatively;
4) Calculating the equivalent (effective) locality factor for the base and target tax rates and incrementally increasing the effective locality factors

The revenue impact of both these mechanisms would be the same. However, using (effective) locality factors has the advantage of being administratively familiar as well as easily understood by the taxpayers. The disadvantage, however, is compromising the spirit of capital valuation and making it difficult for the tax collectors to explain the relationship between the locality factors and the underlying valuation – a challenge of public understanding and acceptance of rising property tax bills.



How to ensure the reasonableness of the assessable values?

Upon the recommendation of the valuation committee, the Directorate General may engage technical resource to conduct a statistical audit to confirm that the new assessable values are reasonable, correct, and consistent as at the valuation reference date, and that the required standard of relative equity both between and within zones of assessments has been achieved.[4] The statistical audit is basically the

[4] Valuation accuracy standards published by the US-based International Association of Assessing Officers (IAAO) are considered to be a gold standard for judging system accuracy. The assessment standards set by the IAAO represent a consensus in the valuation profession with the objective of providing a systematic means by which assessing authorities can improve and standardize their operations.

evaluation of appraisal performance by reference to a set of ratio studies[5] to provide a means for evaluating the accuracy of the appraisal. The following are examples of areas audited to monitor quality standards:

1. the assessable values should be within the acceptable limits in terms of mean assessable value/rent ratio, median assessable value/rent ratio and weighted mean assessable value/rent ratio. All acceptable ratios should be within 0.9 - 1.1 and any ratio below or above this range implies that the assessable values in the zone are under-valued or over-valued;
2. relativity equity between different property groups should be maintained within 5% of the overall ratios. Any result outside this range implies that a particular property zone may be under-valued or over-valued;
3. the dispersion ratios should be within an acceptable range; and
4. there should be no bias within the zones. For example, low value assessments are over-valued or high value assessments are under-valued.

post-revaluation statistical audit, by comparing all available market rents and assessed values, checks whether the valuation exercise has produced accurate and supportable valuations. It establishes for all zones, the degree to which the assessed values are supported by available market rents and enables continuous improvements to be made.

Pre-requisites for successful implementation of Property Tax system[6]

It must be emphasized that reforms in a property tax system will be successful only if improvements are carried out covering all aspects of property tax administration. The amount of revenue raised depends on the cumulative performance of all processes –property identification, valuation, assessment, collection, and enforcement. And therefore, some of the key pre-requisites for successful implementation of property tax system are:

1. ***Comprehensive stakeholder consultations:*** Implementing a self assessment system (SAS) requires strong citizen interface mechanisms consisting of extensive stakeholder consultations and feedback process right from the initial stages of reforming the property tax system. Consensus has to be built across the board with all stakeholders including citizens, excise staff etc as all of them will be affected by the changes in the system
2. ***Creating a GIS database of Properties:*** The E&TD should also create GIS backend support to have a full database of the properties in the urban areas and bring them under the tax net.
3. ***Unique identification code:*** While building up the GIS database, it would be useful to introduce a unique number which would identify the property. This code could locate the property uniquely in terms of ward, the colony and the block and perhaps floor or flat.
4. ***Valuation Committee (VC):*** The government should appoint a VC consisting of experts and persons experienced in urban administration, taxation, and representatives from the local body. The manner of constitution of this Committee, their functions, and the processes that will be adopted to ensure consultation with the citizens should be clearly laid down in the statute.
5. ***Citizen education and awareness:*** During the period of design of the system, citizens should be made aware of the reasons for the reforms, what is being planned and the advantages of the new system.

[5] According to the "Standard on Ratio Studies" issued by the International Association of Assessing Officers, ratio study is used as a generic term for sales-based studies designed to evaluate appraisal performance. Ratios are obtained by dividing the appraised value by the sale price. Various ratios are computed so as to evaluate the level and uniformity of mass appraisal models. In the Rating and Valuation ADepartment, rental values instead of capital values are used in the ratio studies.

[6] Agarwal, A., 'Property taxation system in India'

ANNEXURES

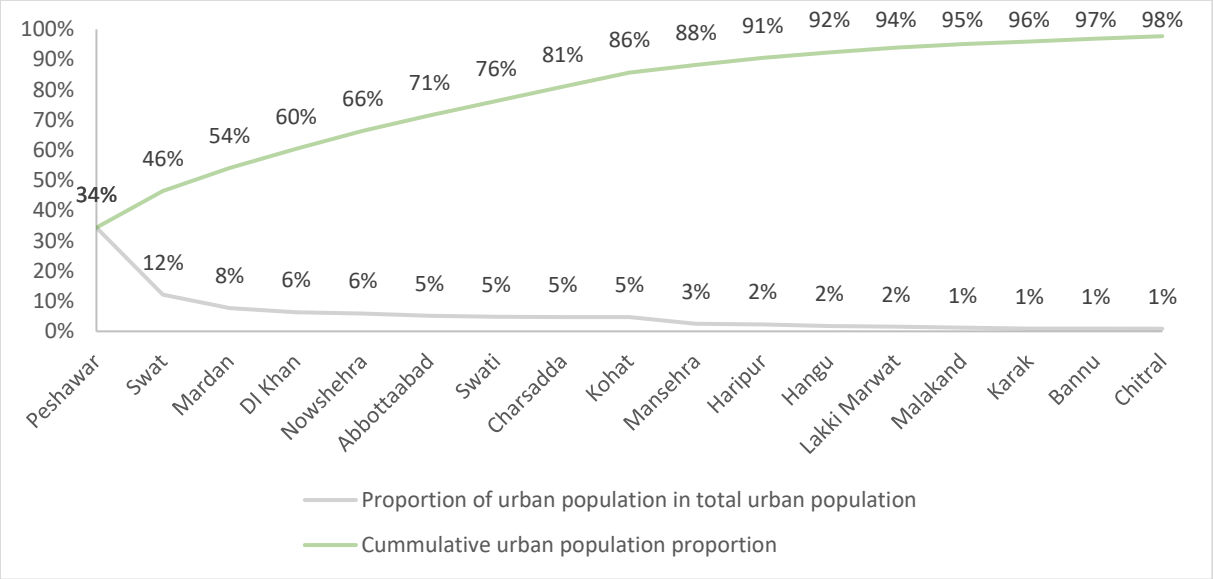
Annexure-I: Existing System of Property Valuation Theoretical Framework and Econometric Model

I.1 Existing System of Assessment and Valuation of UIPT in KP

I.1.1 Context & Background

Khyber Pakhtunkhwa is undergoing significant urbanization. According to the 2017 census provisional results, 5.7 Million people live in urban areas of which alone 1.97 Million reside in the District of Peshawar – 34% of the total urban population of Khyber Pakhtunkhwa.[7] Cumulatively, only four districts – Peshawar, Swat, Mardan and Dera Ismail Khan account for 60% of the total urban population of the province (Figure 1).

Figure 1: Distribution of Urban Population



Note: Author's calculations

While 82% of the province's population is classified as rural, over two-thirds of the population of the province lives within a travel time of one hour of a city, and 90% of the population of the province lives within two hours. The rapid urbanization and development of urban clusters is promising for transforming the urban areas into hubs of economic activities but have implications for the provision of government services. Therefore, there is a premium on capturing the true capital value of urban properties so as to enable the government 'to catalyse a virtuous cycle, where public investments lead to an increase the value of urban land and properties, which creates the financing for further public investment through a well-designed tax multiplier.'[8]

Urban Immovable Property Tax (UIPT) is an important source through which the government can finance municipal needs of urban populations. However, in Khyber Pakhtunkhwa, UIPT revenue collections are not

[7] Population Census 2017 results and can be accessed at:
< http://www.pbs.gov.pk/content/block-wise-provisional-summary-results-6th-population-housing-census-2017-january-03-2018>

[8] Reforming Property Tax in Khyber Pakhtunkhwa: Introducing an efficient, effective and equitable tax policy, 2020. The report can be accessed at:
<Reforming Property Tax in Khyber Pakhtunkhwa | Excise, Taxation and Narcotics Control Department Khyber Pakhtunkhwa (kpexcise.gov.pk)>

robust – in 2019-20, UIPT constituted only 2.05% of total own source revenue. The per capita real UIPT collection is a modest amount of only Rs. 21.51 and its growth has been sluggish (Table 1).

Table 1: Nominal and Real Per Capita Collection of UIPT

FY	Own source revenue (Million Rs)	Property tax collected (Million Rs)	Percent of own source revenue [a]	Population (Million)	Per capita nominal amount (in Rs)[a]	Per capita real amount (in Rs) [a,b,c]	GDP deflator	Index (t-1)
Col (1)	Col (2)	Col (3)	Col (4)= Col (2)/Col (3)	Col (5)	Col (6) = Col (3)/Col (5)	Col (7)=Col(6)/Col (9)	Col (8)	Col (9)
2014	20010.69	463.00	2.31	26.93	17.19	17.19	2.37	100
2015	22706.47	532.04	2.34	27.69	19.22	18.46	2.46	104.11
2016	25576.44	667.64	2.61	28.47	23.45	22.44	2.47	104.52
2017	28347.01	704.62	2.49	29.27	24.07	22.14	2.57	108.72
2018	31267.91	889.05	2.84	30.52	29.13	26.15	2.64	111.39
2019	31810.69	1259.073	3.96	30.52	41.25	34.09	2.86	120.99
2020	42259.39	868.225	2.05	30.52	28.44	21.51	3.13	132.26

Sources and calculations are based on:

[a] Provincial revenue time series data provided by Finance Department GoKP

[b] Population data estimated at growth rate of 2.82% till 2016-17 while for 2017-18, census data of 2017 is used

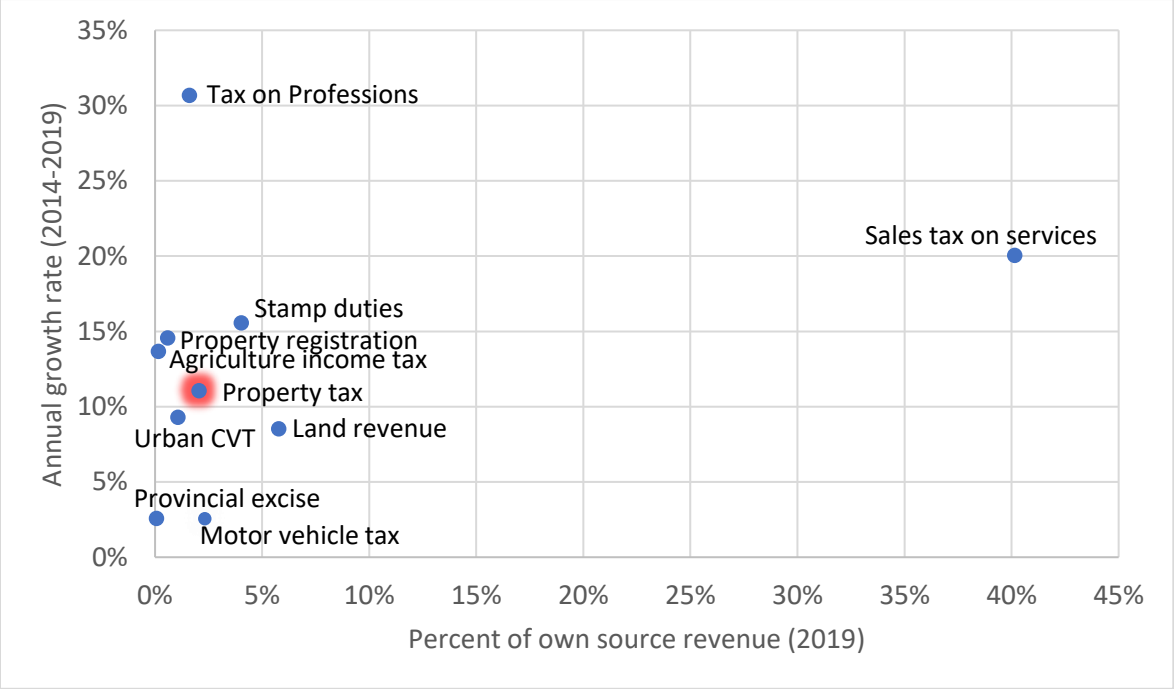
[c] PBS GDP deflator

[d] KP GDP estimates from World Bank (2015)

Note: Base Year 2005-06 =100

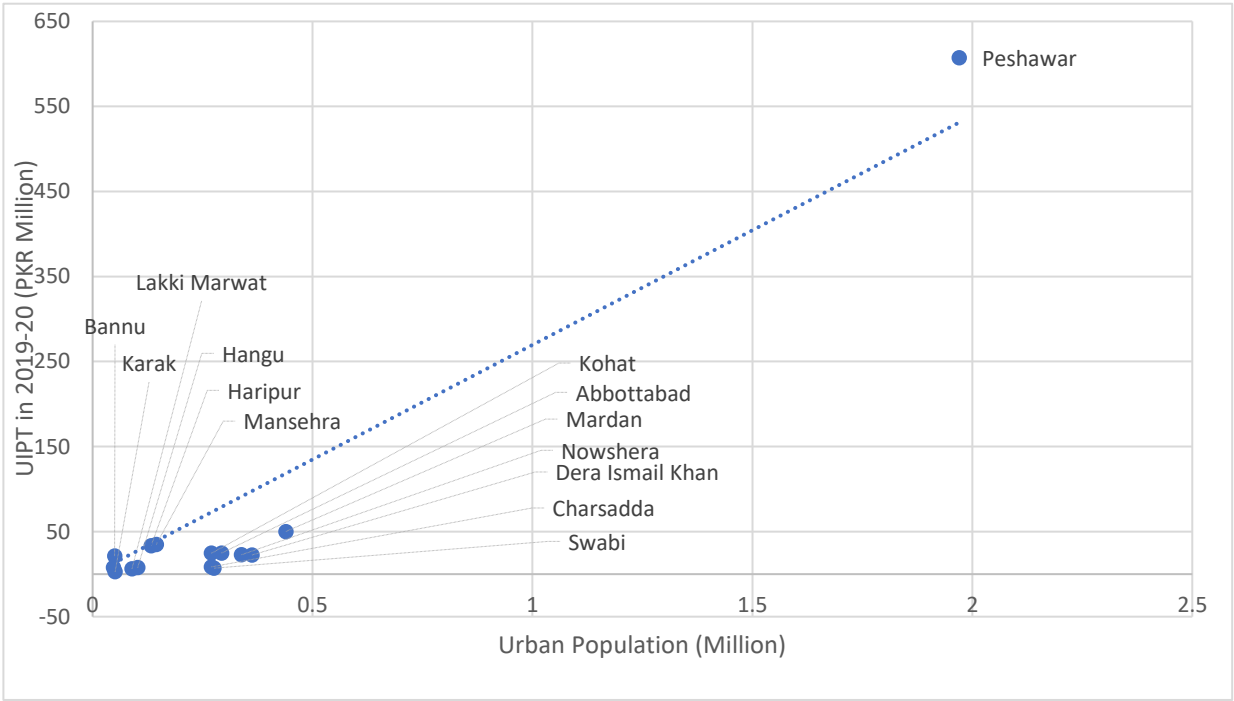
The collection of UIPT, as it stands today, remains sub-optimal. Figure 2 depicts the relative high potential of provincial taxes in terms of their footprint in provincial own-source revenue and their annual growth rate. It can be observed that UIPT while exhibiting a compound annual growth rate of about 11% has a small share of 2% on provincial own source revenue. The potential of UIPT, as a major source of revenue has yet to be realized.

Figure 2: Footprint of Provincial Taxes



Since UIPT is collected from urban areas, a proportional relationship between UIPT collections and urban populations is expected. Treating collections at Peshawar as numeraire, collections from all most all the urban areas of the districts are below their potential (Figure 3).

Figure 3: Relationship between Urban Population of Districts and the UIPT Collection



○ I.2 Assessment and Valuation

▪ I.2.1 Foundations for Assessment and Valuation

The Khyber Pakhtunkhwa Urban Immovable Property Tax Act 1958 and Khyber Pakhtunkhwa Urban Immovable Property Rules, 1958[9] define the legal, institutional, technical and operational premises for assessment, valuation and collections of UIPT. This legislative foundation mandates the Government to specify urban areas for levy of UIPT. Varying rates are applied given in the Schedule 1 (See Annex-1) in respect of residential buildings and Schedule 2 in respect of commercial buildings as specified in the Act.
Residential Buildings are defined as "buildings which are used for the purpose of dwelling, whereas commercial buildings are the buildings along with any appurtenances and installations that may be attached therewith, which are used as office establishment or for carrying on any commerce or trade". However, in case where both residential and commercial units exist in a building, these units are treated as if they are separate buildings. Notwithstanding, certain buildings and lands are exempted from the levy of UIPT such as those of the Government, parks, playgrounds, libraries, and houses not exceeding five marlas (subject to the condition that the building is occupied by the owner himself), residential buildings owned and occupied by widows, buildings and lands or portions thereof used exclusively for public worship or public charity including mosques etc.
Commercial building and Lands within the limits of urban areas are divided into categories A1, A, B, C, and D. This categorization is made on the bases of location, value, type of business therein, rental value, civic amenities, and other variables related to immovable properties.
A rebate at the rate of 20%[10] of the tax assessed is admissible to those assessees who pay the tax in advance for the whole year by the 30th day of September of the year to which it relates. This rebate is enhanced to 35% for those taxpayers who have timely paid their tax in the preceding five years.
Tax is due from the owners of buildings and lands.

▪ I.2.2 Calculation of Tax

UIPT in KP is primarily an area based system of taxation. The tax is levied on areas called 'rating areas', notified by the Local Government & Rural Development Department and is collected from residential as well as commercial areas. Residential properties are subject to progressive tax rates at different slabs depending on area as given in the **Schedule 1 of the Act (reproduced here as Annex-1)**. However, there are a number of exemptions; Federal Government and provincial government buildings if not leased in perpetuity are exempt. Likewise, owner-occupied residential buildings of less than five Marlas are also exempt.
As a rule of thumb, the annual value of any land or building is ascertained by estimating the gross annual rent at which such land or building together with its appurtenances and any furniture that may be let for use or enjoyment with such building might reasonably be expected to be let from year to year. This value may be adjusted with certain allowances like furniture, repairs, land revenue paid etc.
Commercial properties are categorized into five categories: A1, A, B, C and D. These localities are assigned locality factors based on the floor level (basement, ground floor, 1st, 2nd, 3rd, 4th, 5th and all floors beyond 5th floor). The UIPT is structured in a manner that makes square yards of land and square feet of subjected to same tax rate. This implies value of land to be nine times the value of the structure (Text Box 1).[11] This

[9] Originally, the titles were West Pakistan Urban Immovable Property Tax Act 1958 and the West Pakistan urban Immovable Property Tax Rules 1958 which were subsequently changed.
[10] Increased from 10% to 20% vide Finance Act 2020
[11] Roy Bahl & Sally Wallace & Musharraf Cyan, 2008. "Pakistan: Provincial Government Taxation," International Center for Public Policy Working Paper Series, at AYSPS, GSU paper0807, International Center for Public Policy, Andrew Young School of Policy Studies, Georgia State University.

feature of the tax structure might be seen as discouraging efficient land use and encouraging a less intensive use of land.
The UIPT for commercial buildings thus is calculated as under:

- I.2.3 For All Commercial Building

a. Plot area in square yards; and
b. covered area in square feet;
i) passageways, washroom and other public utilities shall not be counted while calculating / counting the covered area;
ii) open sheds and verandas shall be counted as half of its total measurement while calculating covered area;
iii) the formula for tax calculation shall be = (plot area in the square yard (a) + covered area in square feet (b) multiplied by the locality factor (c).
iv) locality factors for computing tax liability are given in the table 2 below:
v) provided that plot area in sq. yards will be counted once in the basement or on the ground floor as the case may be. For upper stories, i.e. from floor and onwards, only covered area will be taken in account and the formula shall be:
covered area in square feet (b) multiplied by locality factor (c) or bxc

Text Box 1. Taxing commercial property

The current system implies differential treatment for land and improvements. There is an important assumption that a 'value unit' one square foot of land and nine square feet of structure. Under the current system:

where;
= Land area in square feet
= Covered area in square feet
= locality (valuation) factor
In other words,

and

where
= the tax rate on a square foot of land
= the tax rate on a square foot of structures
= value per square foot of land
= value per square foot of structures
Since =

Table 2: Locality Factors for Calculating UIPT

Locality / Category	Ground Floor	Basement	1st Floor	2nd Floor	3rd Floor	4th Floor	5th Floor	All other Floors beyond 5th Floor
A1	20	18	18	16	14	12	10	08
A	15	13	13	11	9	7	5	5
B	10	8	8	7	6	5	5	5
C	7	5	5	5	5	5	5	5
D	5	5	5	5	5	5	5	5

a) What does the locality factors signify? A commentary

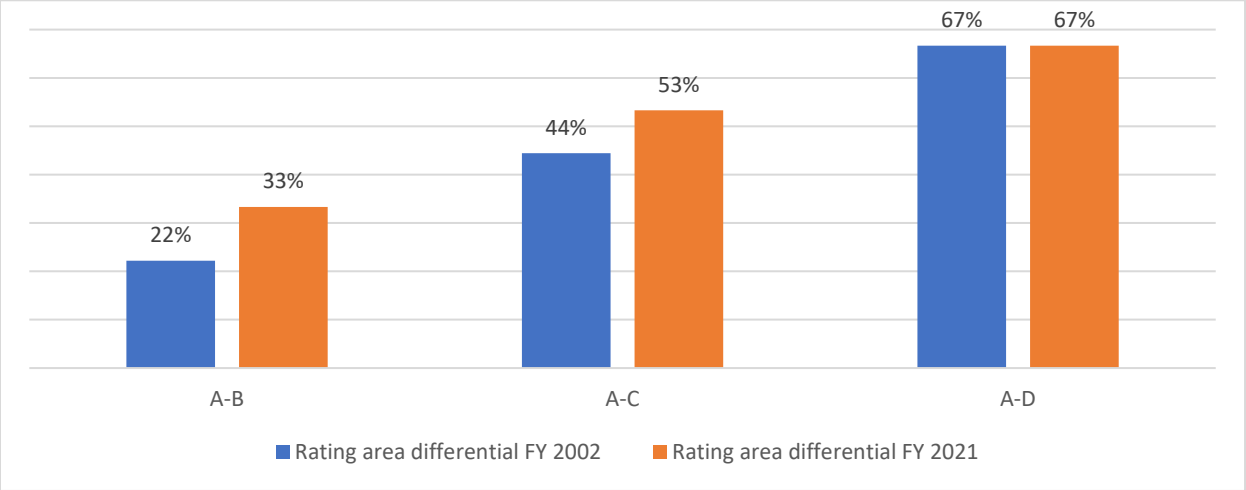
It is intuitive to assume that the locality factors are indicative of some implicit valuation. But how are these locality factors determined and is there a systematic way of determining the locality factors remain un-answered questions. Tracking the amendments in the property tax law reveal that unit area tax rates for

commercial buildings were first introduced in the FY 1998.[12] The concept of valuation zones was thereafter introduced in the FY 2001 when the Khyber Pakhtunkhwa Finance Ordinance, 2000 specified locality areas A, B, C and D for the provincial headquarters with distinct unit area tax rates for ground, first floor/basement and other upper stories in each of the locality areas. Commercial buildings in areas other than the provincial headquarter did not have such zoning and had specific unit area tax rates based on the floor level. The tax liability was to be determined by multiplying the unit area tax rate (Rs per square feet) with the total covered area (in square feet).

The genesis of the currently used formula for calculating the tax liability of commercial buildings lies in the NWFP Urban Immovable Property Tax (Amendment) Ordinance, 2001.[13] This was the first time the concept of locality factors was introduced. This was a transformation from calculating the tax liability on the basis of simple unit area tax rates for the covered area of the floors to a complex area-based calculation taking into account the covered area as well as the plot area. ***However, the mechanism for initial translation of unit area rates into locality factors remains unexplained.***[14] Even this day, the determination of locality factors largely depends on the judgement of the officials and lacks an empirical basis.

Comparison of the locality factors during the FY 2002 (the year when the locality factors were introduced) and the current locality factors indicate that the rating area A today is more valuable compared to rating areas B and C.[15] For example the implicit valuation[16] differential between rating area A and B during FY 2002 was 22% which now stands at 33% - values of properties in rating area A have increased by 11 percentage points compared to rating area B during the last two decades. Likewise, the rental value differential between rating area A and C has gained 9 percentage points (Figure 4):

Figure 4: Inter-rating areas comparison of implicit valuation between FY 2002 and FY 2021



There is an inter-temporal or time dimension to the analysis as well. Figure 5 illustrates the percent variation in the implicit valuation between the corresponding rating areas between the two time periods. The data suggests that commercial properties' values in rating areas A (and D) have increased by 67% from

[12] A schedule was added to West Pakistan Urban Immovable Property Act, 1958 (Act V of 1958). Part-II of the schedule specified unit area tax rates for commercial buildings in provincial headquarters, divisional head quarters and district headquarters. The rates for Ground/First Floor in the aforementioned areas were Rs. 7/sq ft; Rs.4 /sq ft and Rs. 2/sq ft while the rates for basement/upper stories were Rs. 3/sq ft; Rs. 2/sq ft and Rs. 1 /sq ft.

[13] The NWFP Urban Immovable Property Tax (Amendment) Ordinance, 2001 (kp.gov.pk)

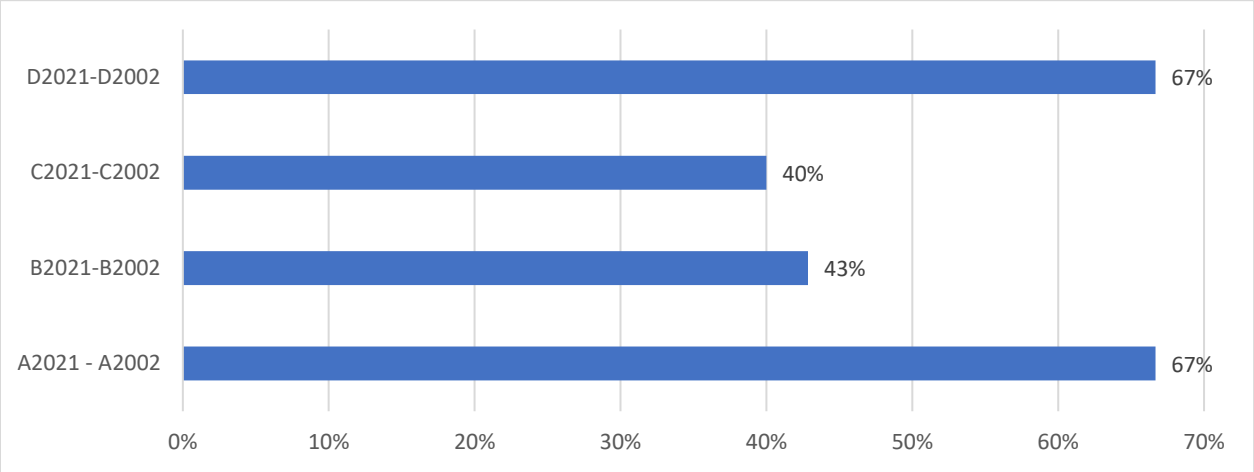
[14] Interview with former Director Revenue, Directorate General of Excise and Taxation, Government of Khyber Pakhtunkhwa.

[15] The comparison is drawn on the basis of percent variation between the locality factors for the corresponding rating areas during the years of comparison.

[16] Since the base –area units – in the formula is constant, the locality factor is indicative of the tax rate and can be treated as an implicit valuation parameter

FY 2002 to FY 2021, while for rating areas B, this increase is limited to 43%. This increase in implicit valuation is not commensurate with the market trends. Using a proxy of housing prices inflation, there has been 163% increase in the houses prices in Peshawar from 2011 to 2021. [17] Thus, there is a loose evidence of the locality factors capturing only a part of the value of properties.

Figure 5: Inter-temporal comparison of implicit valuation between the same rating areas (FY 2002 and FY 2021)



- ## I.2.4 Educational Institutions

a. The tax shall be calculated based on the covered area only. The area of the plot as required for other commercial buildings shall not be taken for computing the tax.
b. The tax calculated based on (a) above shall bet a special thirty percent rebate being provided to all the educational institutions.

- ## I.2.5 Industrial Properties

a. Industrial buildings within the limits of rating areas shall be assessed for the purpose of this tax at a flat rate of Rs. 2.50 per square foot of the each building in factor area. A similar rebate of thirty percent as educational institutions is given to industrial properties.
b. Provided that, all the residential buildings, colonies, hostels, mess, schools, etc. within the premises of the industrial compound shall be assessed and taxed as per existing Schedule 1 of the Act (reproduced as Annex-1). Similarly, all commercial buildings other than factory area including workshops, shops, godowns, banks, petrol pumps, factory offices, mobile towers, etc. situated within the industrial compound shall be assessed and taxed as commercial buildings or educational institutions, as the case may be. (Note: Factory area shall mean a building or group of buildings wherein finished, semi-finished or raw goods are manufactured, processed, stock filed, or assembled).

- ## I.2.6 Others

Service Station of vehicles, irrespective of operating in addition to other services such as filling station or otherwise are charged at flat rate of Rs.15,000 per annum.
Buildings and Lands used for erection of Mobile Phone Towers shall be assessed and taxed at the rates:

[17] House Price Index in Pakistan - Zameen.com

(i) Provincial Headquarter …….Rs.40,000 per annum;
(ii) Divisional Headquarter and ……..Rs.30,000 per annum and respective sub-urban areas; and
(iii) District Headquarter and ……Rs.20,000 per annum; respective sub-urban areas.

○ I.3 Institutional and Operational Mechanism for Assessment, Valuation, and Collection of UIPT

For every rating area, the respective District Excise and Taxation Officer of the Excise Taxation and Narcotics Control Department is the ***Assessing Authority***. A valuation list for each rating area is made by each assessing authority which is effective for a period of 03 years. Generally, such valuation lists come into force on first day of July or the first day of January. The Assessing Authority is required to maintain a property register for the rating area and enter necessary particulars separately for each unit of property.
However, an important provision in the Act is that "after every three years the tax shall be increased at the rate of fifteen percent of the tax last assessed and a new valuation list shall accordingly be prepared".
The procedure requires that a draft valuation list is prepared for the area and is published for public scrutiny for grievances, if any. Any person aggrieved by an order of the appropriate authority upon an objection made before that authority may appeal against such order, at any time before the expiration of thirty days from the date of such order, to the Collector of the district in which the building or land to which the objection related is situate, or to such other officer as the Government may, by notification, appoint in this behalf.
In case where new valuation list is intended, the assessing authority may serve a notice on the owner, occupier or lessee of any building or land in the said area to make a return containing such particulars as required for the assessing authority for making of new valuation list. Such a person, to whom the return is required, shall, within thirty days make a return in such form as is required by the notice, and deliver it to the assessing authority.

○ I.4 Procedure for Valuation

The procedure for valuation is given in the Rule, summarized as under:

- ✔ divide the rating area, if necessary, into sub-divisions or mohallas;
- ✔ number each unit of property situated within the rating area, with reference to the sub-division or mohallas and streets, if any in which it is situated, and mark the number allotted to each unit or property on some conspicuous part of the property;
- ✔ ascertain the name of the owner and the occupier, if any, of the property and note the same in a register; (explanation: — If the property be owned by more persons than one in defined or determinable shares, the names of all of them shall be entered as owners with the share owned by each.)
- ✔ give public notice, and, if necessary, issue notice to any owner, occupier, or lessee of any property in a rating area, or to any one of them, requiring him or them to make a return;
- ✔ make an enquiry about the gross annual rent earned or which could reasonably be earned in respect of the property during the financial year immediately preceding the current financial year;
- ✔ determine, from such other date as may be available, the gross annual rent at which any property in the rating area may reasonably be expected to be let from year to year, if in its opinion the average gross annual rent of such property is not fair or reasonable when compared with such rent of any other property in that locality;

- ✔ determine the total area of residential building and the covered area of a commercial building from the records of the concerned authorities.

▪ I.4.1 Publication of Draft Valuation List and Objections

The draft list is published on either placards posted up, and/or by the beating of drum, and/or by publication in at least one English and Urdu daily newspaper for public inspection and grievance, if any.
The objections by an owner or lessee or any other person grieved by the draft valuation may be addressed to the Assessing Authority on written memorandum on plain judicial paper bearing a Court-fee stamp. The Assessing Authority hears the objections on a fixed date and orders passed or recorded.
A final valuation list is prepared after disposing of all objections. Such a final list is authenticated by the Assessing Authority before the first day of July or January, as the case may be.

▪ I.4.2 Collection Procedures

As a general procedure, the Director, Excise and Taxation, may authorise the payment of the tax in any rating area at the office of the assessing authority concerned or may appoint a tax-collecting staff for any rating area on such terms as to furnishing of security and emoluments as he may deem fit.
Such appointed staff work under the orders and control of the assessing authority, and are competent to visit an assessee at his residence or place of business with a view to collecting the tax and penalty, if any, imposed on him.
For every payment, except a payment made at a Treasury, a receipt is given to the person making the payment and the counter-foil retained.

○ I.5 Valuation infrastructure in regional context

In the Indian state of West Bengal, valuation of Urban Local Bodies (ULB) takes place every five years. The statutory body of a West Bengal Valuation Board (WBVB) is mandated to carryout valuation of urban properties for municipal taxation purpose. Similarly, in the state of Kerala, an independent Property Tax Board renders advice on valuation of properties in a Municipality. In Mumbai, capital value system is used for the purpose of property tax which uses the market value of property as a basis. The market value is ascertained using the ready recknor rate which is a set by the state government d is a compilation of fair value prices of properties.[18]

[18] The Stamps and Registration Department fixes the ready reckoner rates depending upon the market value of the area.

o I.6 Rate of Tax for Residential Buildings

S#	Category	Rate of tax for areas of Provincial Headquarter as notified by the Government (per annum) (Rs)			Rate of tax at Divisional Headquarter (per annum) (Rs)		Rate of tax in suburban areas of Divisional Headquarters (per annum) (Rs)		Rate of tax at District Headquarters (per annum) (Rs)		Rate of tax at District other than District Headquarters (per annum) (Rs)	
		A	B	C	Town-ships	Other than Townships	Town-ships	Other than Townships	Town-ships	Other than Townships	Town-ships	Other than Townships
1.	Upto 5 Marlas (other than self occupied)	1500	1300	1100	1300	1100	800	500	600	500	400	300
2.	Exceeding 5 Marlas but not exceeding 10 Marlas	2500	2400	2200	2400	2200	1400	1100	1200	1100	900	700
3.	Exceeding 10 Marlas but not exceeding 15 Marlas	3300	3100	3000	3100	3000	1600	1500	1600	1500	900	800
4.	Exceeding 15 Marlas but not exceeding 18 Marlas	4800	4700	4500	4700	4500	2500	2300	2500	2300	1300	1000
5.	Exceeding 18 m but not exceeding 20m Marlas	15,000	13,500	12,000	13,500	12,000	7,500	4,500	6,000	3,000	2,250	1,500
6.	Exceeding 20 Marlas but not exceeding 30 Marlas	22,500	21,000	18,000	21,000	15,000	12,000	9000	7500	4500	4500	3000
7.	Exceeding 30 Marlas but not exceeding 40 Marlas	30000	27000	24000	27000	24000	21000	18000	15000	12000	9000	6000
8.	Exceeding 40 Marlas	45000	37500	30000	37500	30000	22500	18000	15000	12000	9000	6000

PART 'B'

Building acquired for the use by Government, Semi-Government, Non Government Organizations, Development Financial Institutions, private commercial organizations, guest houses, hostels or by Banks shall be assessed and taxed twenty percent of the actual annual rent. In case building other than those exempted under section 4 of the Act, which are owned and occupied by such organizations, tax shall be levied on the assessed annual rental value of such buildings on the rate prescribed hereinbefore.

PART 'C'

Tax on properties let out on rent, lease or other arrangement and not in use of their registered owners will be double of the above, except for the category-1 (upto 5 marlas).

Explanation: Categorization of area in Provincial Headquarter into Category "A", "B" or "C" shall be by way of notification by the Local Government & Rural Development Department, to be notified from time to time. In Divisional and District Headquarters, Townships are approved Townships and include those areas, which are declared so by Local Government & Rural Development Department from time to time."[19]

[19] The Stamps and Registration Department fixes the ready reckoner rates depending upon the market value of the area.

Annex-II: Econometric Model for Property Assessment

○ II.1 Analytical Framework:

Property value is the function of many variables reflecting not only its location but equally affected by other amenities such as the quality of neighborhood, infrastructure, environment, economy and public policy. In order to develop a comprehensive system, it is important to examine and analyse the set of all these variables to qualify and quantify their relationship viz a viz value of land.

In order to reduce this bias and to adopt a systematic approach, an analytical framework has been developed as shown in the Figure; It comprises of four different phases:

The first phase studies the existing literature to determine the meaningful variables that could influence the value of properties.

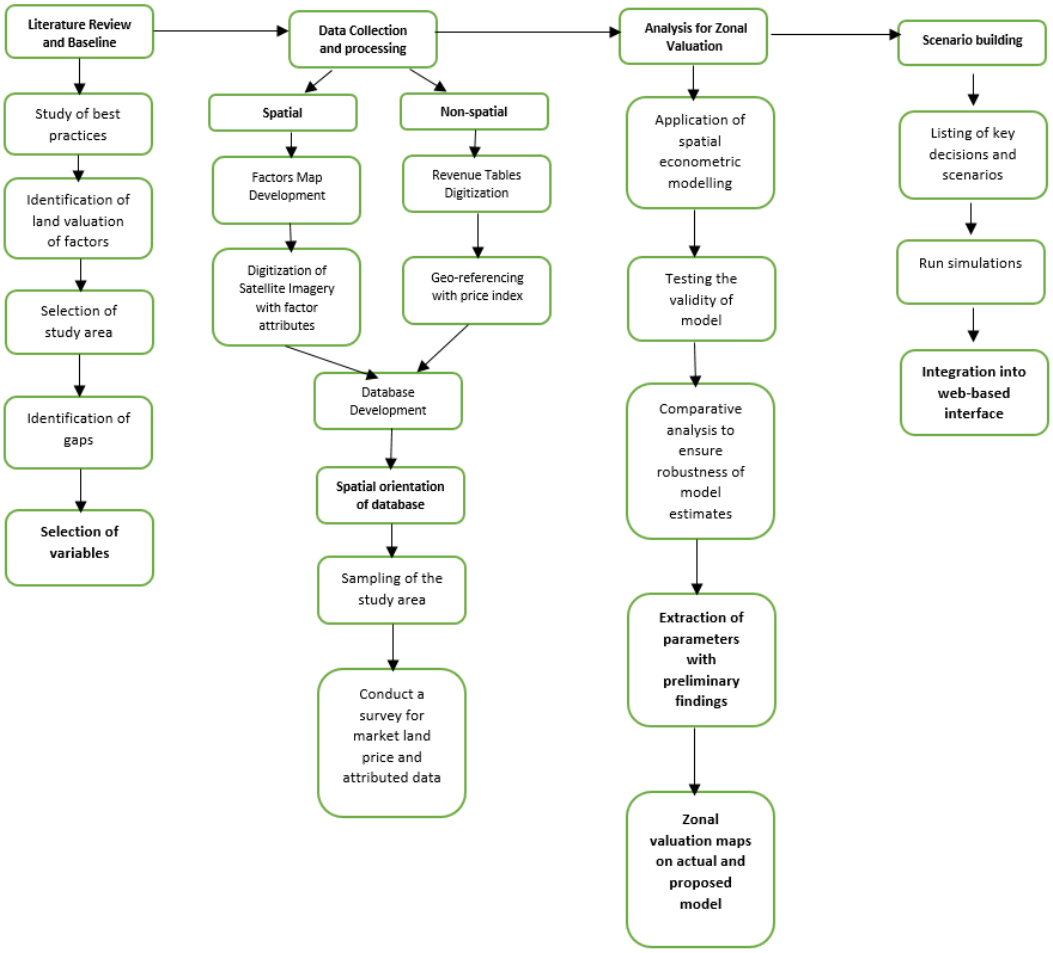
In the second phase, the data about the study area would be collected and processed in GIS environment to qualify and quantify each variable. Spatial data will be digitized along with the factor variables. Non-spatial data, on another hand, geo-referenced to make it consistent with the spatial data. After the collection of spatial and non-spatial variables, datasets are merged into a single database making it ready for econometric and statistical spatial data modelling.

The third phase performs analysis and data modelling using spatial analytical tools such as spatial PCA, Spatial Regression and Econometrics to extract the parameters. This step aids in determining how each and every variable is contributing to determining the value of land. After the selection of final model using appropriate variables, zonal maps would be developed using the model.

In the fourth phase the framework runs scenarios analysis for various land uses and possible changes in terms of property taxe and vice versa. This step gives an additional check to ensure the strength of model finalized in the last step. For this purpose, the value of variables are modified artificially to observe how the model is trying to behave in a real-world scenario.

The model will be tested on their predictive accuracy using test set, the train and test split would be 80% and 20% respectively. Estimating the property values of the test cases would display the usability of the predictive model.

The following diagram explains the flow of activities or the analytical framework.



○ II.2 Literature review

The review of the existing literature has been carried out with two-fold objectives:

- Comparative analysis of various Valuation Methods & selection of suitable parameters.
- Study and analysis of GIS based valuation models.

○ II.3 Methods of Mass Appraisal for property Valuation:

The property valuation exercise is historically undertaken ensuing traditional approaches in most of the developing world. However, the developed world has shifted towards modern and more efficient models of mass appraisal generally referred as Automated Valuation Methods (AVMs) based upon various spatial, structural and locational attributes of properties.

In Pakistan, the average rental value of a demarcated area is used to assess the value of properties at mass level and generally gives acceptable results at a specific time. However, the Income Analysis and Cost Analysis methods require not only a lot of labour but also entail lot of complications in terms of age, quality and other attributes of property.

It is also very pertinent to mention that all the entities take “location” as their basis for valuation but none of them defines the attributes of location or uses the spatial data while determining the land value as described in Table.

Table 4: Summary of Traditional Land Valuation Approaches

Income Approach	Sales Comparison Approach	Cost Approach
Income approach values real estate on the basis of rental income.	Sales comparison approach values real estate by taking similar real estate as the benchmark	Cost approach measures the value of the real estate by adding the value of land and cost of the building adjusted for depreciation.
Pros		
Easy to understand.	No discount rate is required to value the land.	This approach is extremely helpful for the valuation of those properties that have no similar properties in comparison or for those properties producing no rental income.
Rent and discount rate can simply determine the value of the property.	Valuation data on similar properties are easily available leading this approach widely used in the real estate sector	
Cons		
The discount rate can vary from year to year leading to incorrect estimation of the property.	This approach can only be employed if there are comparable properties to the property for which valuation is required.	Cost of the items that are included in depreciation cost of the building is subjective leading to the nonobjective valuation of the real estate.
This approach is property specific but applied generally to entire circle/zone.s		

The modern approaches of AVMs are based on regression analysis ranging from simple to multiple regression. It involves the use of computers and formulas to establish a relationship between property characteristics and sale prices, thereby permitting an estimate of the market value of other properties not subject to a recent sale. Artificial Neural Networks (ANN), Autoregressive Integrated Moving Average (ARIMA), fuzzy logic, hedonic price method, spatial analysis method are few of the modern approaches employed to measure the value of land (Pagourtzi et al. 2003)[20].

The artificial neural network model is basically one of the applications of machine learning that requires to be trained from real-world data. The model is then employed to estimate the price of new properties from the same market, Nghiep and Al (2001). Fuzzy logic takes its inspiration from the classic binary logic.

More sophisticated and less expensive GIS technology offers the potential for full for spatial analysis-based mass appraisal. GIS-based valuation is one of the widely used approaches to determine the intrinsic value of the land. Researchers have employed different statistical techniques along with GIS tools to value the real estate, Levine (1996). Usage of spatial data along with econometric tools gives spatial analysis gives an edge over the other land valuation techniques, Panatier (2012).

○ II.4 GIS based Valuation Approach:

Researchers have proved through empirical evidence that there is a significant relationship between spatial factors such as locational, physical, environmental, infrastructure characteristics and the value of properties. With the use modern GIS technology, it has become quite practical to examine these spatial variables as model input for valuation exercise for a particular area. In GIS-based assessment, every type of

[20] Hedonic price method involves the valuation of real estate where market price of individual characteristics of land are not available. Janssen et al., (2001) estimated the value of different attributes such as air quality, airport noise, and commuter access and neighborhood amenities.

information can be geocoded with an integrated spatial-database which provides robust tools for data auditing, maintenance, updating and analysis in an automated manner that can help reduce time and cost. Access to better data collection, data modelling and diagnostic tools through an integrated system gives better, faster and more accurate property or land assessments (ESRI 2013). In the instant exercise, spatial econometrics & GIS analytics would be deployed to develop a GIS-based Automated Modeling technique as the basis for property valuation.

Each of the data field would be georeferenced and digitized into shape-file format. Similarly, data on sales comparable/transactions would also entered into the excel file. Each of the data files would then digitized and merged with other shape-files. After the conversion of data files into shape-files, that would be merged into a single database to perform spatial analysis. The merged database would all the attributes of the shape-file including the coordinates and geometry that define each feature in the database.

Early studies on land value determination usually consider the distance to the central business district as the single important factor (Kau and Sirmans, 1979; McDonald and. Bowman, 1979; McMillen, 1990, among others). Many researchers, afterwards, put lot of emphasis of infrastructure, economic and social variables [Brondino and Silva (1999), Selim (2009), Dizauddin et al. (2013), E. Larsen and P. Blair (2014), Famuyiwa and Babawale (2014), Kemiki (2014), Demetriou (2016)].

Kamali, Hojjat and Rajabi (2008) grouped the variables determining property values into; environmental variables, neighbourhood variables, accessibility (location) variables and property variable. Oyebanji (2003) identifies seven factors that affect property values. These factors are; population (increase or decrease), changes in fashion and taste, institutional factors (these are factors relating to people's culture, religious belief and government action), technological factors, economic factors, location and complementary uses. Ge and Du (2007) opine that property value is an essential aspect of property markets worldwide and determined by a variety of factors and the determination of those factors is a significant part of property valuation. This also includes the economic growth rate and macroeconomic conditions of a country. Certain studies also refer to government regulations such as Floor Area Ratio (FAR), land-use rules and land titling system as contributing factors to land valuation.

Similarly, general economic conditions at macro levels such as income levels, the profitability of business and tax rates, inflation and interest rates are also important factors in determining general level of value at any given point in time (Gallimore, Fletcher and Carter, 1996).

In the essence, property/land value is a multi-dimensional concept that is comprised of a bundle of unique characteristics reflecting not only its location but equally affected by other amenities such as the quality of neighborhood, infrastructure, environment, economy and public policy. So, it varies from place to place and country to country. In order to develop a comprehensive framework, it is important to examine and analyse the set of all these variables to qualify and quantify their relationship viz a viz value of a properties. The GIS-based Valuation Method requires translating all the above variables into GIS environment with focus on micro-level layer. Each dimension has been represented by a number of indicators and sub-indicators having spatial reference and value.

There are certain challenges as well. Although GIS makes data analysis easier and time efficient but collecting and updating the input data for the analysis can still be difficult and quite a laborious exercise. It still requires substantial labour to digitize the existing attributes of land value and create a composite database. However, in recent years, the availability of open data and their continuous new releases are becoming more sophisticated, providing advanced datasets such as up-to-date Volunteered Geo-Information (VGI). With such data access worldwide, advanced spatial analysis is becoming more and easier and efficient. It is just a matter of time that the spatial data layers would be readily available on various networks with general public access. Recently, the famous property portal has initiated the services namely "property map" for entire Pakistan. With the availability of this dataset, it has now relatively become very easy to shift to GIS based property valuation system.

More specifically, the proper implementation of the spatial approach for property valuation demands the recognition of spatial effects and their subsequent implications for spatial statistics (Anselin, 1998). Nevertheless, it is possible to account for spatial dependence by including a neighborhood matrix based on adjacency, assigning more weights to the neighboring observations than the distant observations, as nearby observations are more helpful in explaining the variation in prices (Bidanset & Lombart, 2014; Anselin, 1998). Another common phenomenon in spatial modeling is spatial heterogeneity i.e. the effect of spatial dependence doesn't have the same influence on correlations across the study area in addition to the varying price and attributes relationship over the space; this indicates the presence of spatial heterogeneity. As a consequence, models with a local focus are required to obtain consistent estimators, resulting in different regression results for each unique location (Fotheringham et al., 2002). These two problems associated with traditional techniques make local regression methods suitable for property valuation. Local regression method is among the most effective and robust methods that can account for Spatial heterogeneity and Spatial dependence.

The local regression method to be used in this study is Geographically Weighted Regression (GWR). This method operates by assigning weights to the observations based on their distances to a geographical focal point. The assignment of weights ensures the inclusion of clean observations in the estimation process by using distance decay as basis of the weight system. There are several kernels that can be used for the assigning the weights, the results remain more or less same as long as the kernel is "Gaussian-like" (Fotheringham & Charlton, 2009). The choice of the kernel's bandwidth parameter is crucial for better model fit and consequently it is required to use optimal bandwidth parameter (Borst & McCluskey, 2008). These spatial statistical methods including GWR are implemented using a local regression model in ArcGIS Pro or GeoDa.

o II.5 GIS based Valuation Models:

▪ II.5.1 Shenzhen, China

China seems to be taking the lead in automating the process of land valuation for taxation purposes. China automated the mass appraisal system by employing a Computer Assisted Mass Appraisal (CAMA) model to value the land located in Shanghai and Beijing. However, incorporation of spatial data was later applied on the Shenzhen that led to upgrading CAMA to GAMA. GIS tools enable the use of 3D data in measuring the value of the land. Shenzhen is located in the southeast part of China that connects Hong Kong to mainland China.

China enacted a property tax in 2003. The central government chose six pilot experiment cities for mass appraisal of properties. Shenzhen was selected as one of them. Government formulated Shenzhen's Center for Assessment and Development of Real State to initiate citywide valuation. China in collaboration with Lincoln Institute and Peking University computed prices for 0.17 million buildings in 2010. By 2011, this number rose to 1.5 million residential properties.

GAMA model enables the assessor to determine the value of the property from home. In other words, the assessor is not required to physically inspect the property. All the relevant variables have been incorporated in the model that can compute the price of land. Since the implementation of the GAMA model in Shenzhen, property transaction taxes have been implemented effectively. Out of a million properties valuated, there were only a handful of properties that required readjustments.

Shenzhen is considered as one of the relatively new young market leading to a shortage of transaction data. Furthermore, properties are valued at a lower price to avoid the transaction tax. Finally, the city is home to a distinct group of housing types. However, data limitations on transaction data are countered by employing 3D model. This implies that data on all floor of the buildings is available in digital format that can be easily applied in the model. Similarly, a team of experts in treating those distinct groups of housing as

separate 'sub-markets'. In that way, they were able to estimate price across the entire market with fewer data points overall.

▪ II.5.2 Nairobi, Kenya

In the case of a developing country, Ludiema et al., (2018) attempted to develop the web-based geographic information system for mass land valuation in Kenya. For this purpose, the authors chose Westland Constituency of Nairobi County. This study relies on following spatial and non-spatial data to value land using geographical information system.

Table 5: Dataset Used

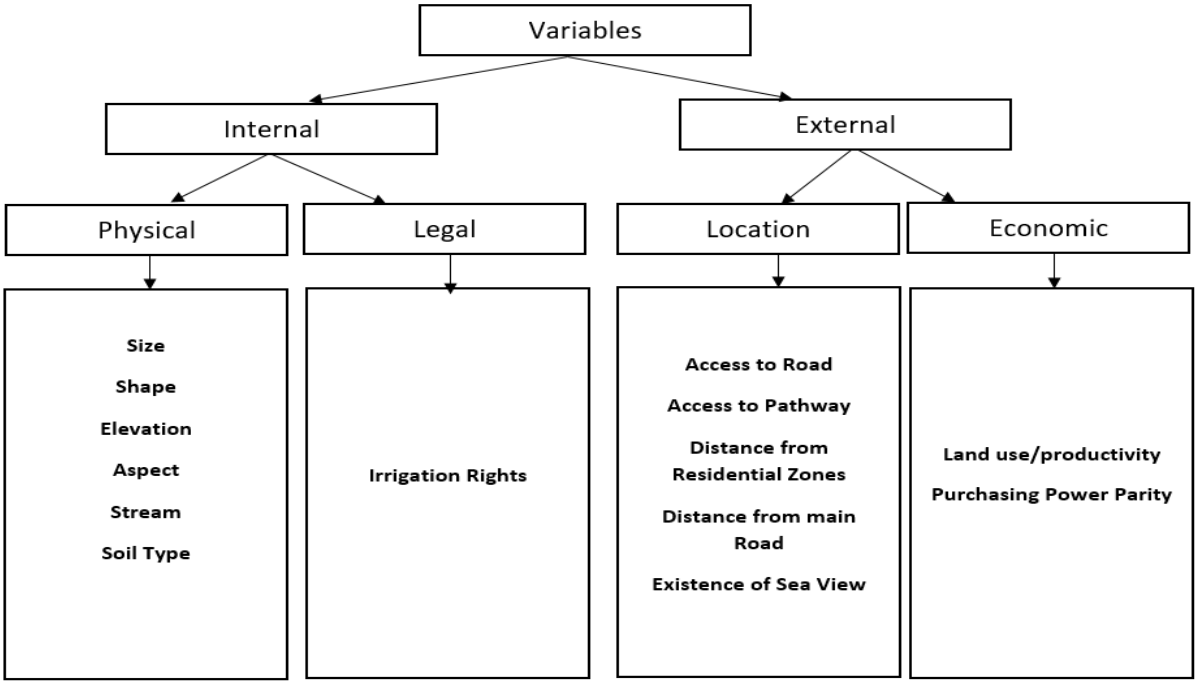
Datasets	Type	Data Format	Source
Land Parcel Data	Primary	Esri Shapefile	Nairobi City County
Building Data	Primary	Esri Shapefile	Ramani Geo-systems
Road Data	Primary	Esri Shapefile	Ramani Geo-systems
River Data	Primary	Esri Shapefile	Nairobi City County
Estate Data	Primary	Esri Shapefile	Ramani Geo-systems
Sales Comparable	Primary	Excel	National Land Commission
Base Maps	Online		Open Street Maps

GIS system in Westland Constituency in Nairobi City County is based on two tiers. The first tier is an application server which is composed of an open-source spatial database system that is centralized for use by all users. The second tier is a web-based mass GIS valuation system hosted on the website. The property mapping application is created to give various features such as the spatial view of parcel and valuation zones during the preceding valuation year. This system allows the user to search for specific property information using the parcel number from the centralized mass valuation roll database. The database contains extensive information on land including the parcel number, parcel owner, area, street, estate, land value, geographic valuation code, map number, geographic valuation zonal rates, and unimproved site value. This is a piece of extremely useful information for property investors who are interested in knowing all the above-mentioned characteristics of land before making a sound decision on property transactions. The GIS-based system allows for full automation, continuous and timely updating of the mass valuation roll based on the geographic information that is very effective. Up to date, a centralized database allows for optimal property taxation. Development of a GIS assisted mass appraisal can be used to enhance the revenue collection from the property taxes. This system will also monitor the timely collection of property taxes within the mass land valuation authority. Furthermore, the overlay of sales comparable on the maps leads to the improvement of valuation done via spatial analysis. It will determine whether the price computed via spatial analysis is consistent with the sales comparable data.

▪ II.5.3 Cyprus

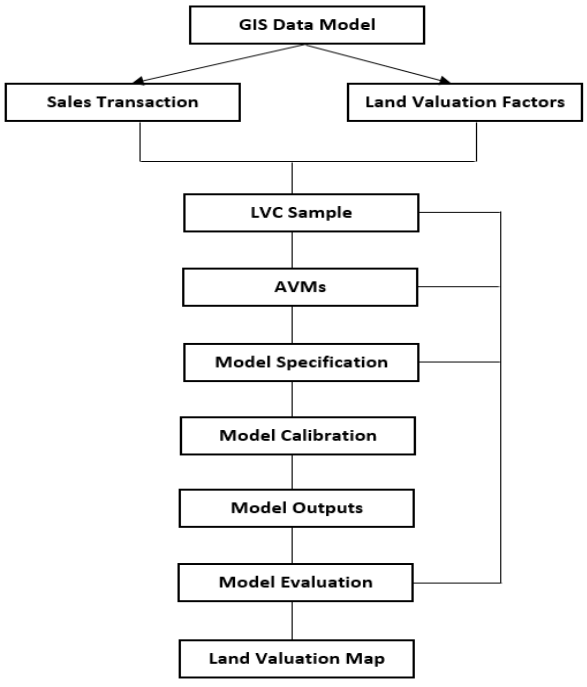
Demetriou (2016) developed a new land valuation framework for Cyprus. The author has chosen Choriokoitia village located in the Larnaca District of Cyprus. It comprises land of 266 hectares and the village is built on a hill with an average level of 230 meters. Land valuation in the area is carried by the Land Valuation Committee. The authors have classified the variables into two major categories.

Figure 4: List of Variables



Land Valuation Committee (LVC) of Cyprus have been formally using Multiple Regression Analysis (MRA) to value the land in-country. However, the author suggested that MRA could not bring unbiased results as the variables shown in Figure are spatially auto-correlated with each other implying significance of parameters cannot be decided via MRA. The author proposes an Automated Valuation Model (AVM) to value the real estate in the country. In order to address spatial autocorrelation, AVM needs to be built in a GIS environment. The proposed framework is shown in Figure. Data on sales transaction and land valuation factors will be geo-referenced and digitized on the maps. Afterwards, the sample will be drawn randomly from the data provided by LVC. AVM will be employed on the sample data. The model specification will define the variables that will be included to predict the market value of the land. Calibration involves testing the structure of the model to estimate variable coefficients for model evaluation. The model evaluation will ensure whether the estimates obtained via AVM are consistent with the literature. In case of inconsistency, variables will be redefined, followed by calibration and evaluation. After getting consistent estimates, the parameters will be utilized to predict the market value of land in the GIS environment.

Figure5: Automated Valuation Model (GIS Environment)



- ## II.5.4 Alkmaar, Netherlands

Oud (2017) was interested in measuring the value of the land using a geographical information system. For this purpose, this study relied on one of the city of the Netherlands named Alkmaar. Alkmaar is considered as the medium-sized city in the Netherlands. Alkmaar is chosen due to the fact as the housing market of the city is representative for the Netherlands i.e. there is no demand or supply gap present in the housing and land market of the city.

The author has employed hedonic price modelling to estimate the value of land and house. However, unlike other studies, this study goes one step further by incorporating the spatial data in the model. Addition of spatial variables in the model will lead to fair and accurate mass valuations. This study has divided the variables into two categories: explanatory variables and descriptive variables. Both categories are further divided into two sub-categories; the former category is decomposed into spatial information and physical information while the latter category is divided into legal information and administrative information. The variables, under each of the category, are listed in Table below:

Table 6: Two Main Categories of Independent Variables

Explanatory Variables			Descriptive Variables	
Spatial Information	Physical Information		Legal Information	Administrative Information
Fine Location	Type of Property	Maintenance	Investment	Entry date
Heavy Traffic	Building Period	Fireplace	Leasehold	Closing date
	Rooms	Parking	Partly Rented	Duration
	Garage	Parcel Size	Buyer Condition	Listing price
	Furnished	Shed	Sale Condition	Transaction Price
	Volume	Apartment	Status	Neighborhood
	Inbuilt Garage	Roof Type		
	New Estate	Housing Type		
	Isolation	Garden Size		
	Basement	Heating		
	Quality	Living Shape		
	Elevator	Living Size		
	Monumental	Basic attic		
	Size	Garden		
	Balconies			
	Toilets			
	Floors			

In order to collect data on the relevant variables to predict the price of real estate in Alkmaar, there was a need to take a sample of the city that represents the whole city. For this paper, two major clusters were identified that constituted 23% of houses in the city. The first cluster contains houses built between 1971 and 1980 while the second cluster consists of houses built between 1981 and 1990. Four models are employed on these two clusters to see how additional spatial data improves the model in prediction of prices:

- The non-spatial model
- The spatial non-GIS model
- The GIS-based spatial model
- Geographically Weighted Regression Model

The study objectified the spatial information that aided in running spatial model successfully without invoking any spatial autocorrelation in the model. This study found that both cluster groups in Alkmaar exhibit that inclusion of spatial variables are significantly improving the predictive power of models suggesting space should not be excluded in current property valuation models.

▪ II.5.5 Spatial Hedonic Regression Model:

Locational effects are crucial part of the way the land market functions. Law of geography given by Tobler "Everything is related to everything else, but near things are more related than distant things" explains the autocorrelation or spatial dependence, often present in the real estate data (Tobler, 1970). Using the non-spatial model for the spatial goods wouldn't capture the true casual impact of the explanatory variables on land prices. More specifically, the proper implementation of the spatial approach for property valuation demands the recognition of spatial effects and their subsequent implications for spatial statistics (Anselin, 1998). Nevertheless, it is possible to account for spatial dependence by including a neighborhood matrix based on adjacency, assigning more weights to the neighboring observations than the distant observations, as nearby observations are more helpful in explaining the variation in prices (Bidanset & Lombart, 2014; Anselin, 1998). Another common phenomenon in spatial modeling is spatial heterogeneity i.e. the effect of spatial dependence doesn't have the same influence on correlations across the study area in addition to the varying price and attributes relationship over the space; this indicates the presence of spatial heterogeneity. As a consequence, models with a local focus are required to obtain consistent estimators, resulting in different regression results for each unique location (Fotheringham et al., 2002). These two problems associated with traditional techniques make local regression methods suitable for property valuation. Local regression method is among the most effective and robust methods that can account for Spatial heterogeneity and Spatial dependence.

▪ II.5.6 Model Specification (Local Spatial Model):

$$Y = \beta_0 + \beta_1 WX_{1k} + \beta_2 WX_{2k} + \ \ldots + \beta_N WX_{Nm} \ + \ Error$$

Where
Y = price of the property,
β_0 = constant
X = multidimensional attributes of the property,
K = land parcel
W = spatial weight matrix

The local regression method, to be used in this study is Geographically Weighted Regression (GWR). This method operates by assigning weights to the observations based on their distances to a geographical focal point. The assignment of weights ensures the inclusion of clean observations in the estimation process by using distance decay as basis of the weight system. There are several kernels that can be used for the assigning the weights, the results remain more or less same as long as the kernel is "Gaussian-like" (Fotheringham & Charlton, 2009). The choice of the kernel's bandwidth parameter is crucial for better model fit and consequently it is required to use optimal bandwidth parameter (Borst & McCluskey, 2008). These spatial statistical methods including GWR are implemented using a local regression model in ArcGIS Pro.

Annex-III: Survey Data

Annex-IV: Terms of Reference of the Project:

o III.1 Task 1- Property Valuation Framework Development, Testing and Implementation

The following activities will be performed:

▪ III.1.1 Situation analysis

- The firm will study the ***existing institution and assessment framework*** of property tax in the province
- The firm will collect existing ***historical data of property tax*** in the proposed two urban areas
- The next sub activity will be finding the ***gaps and challenges*** in the existing property valuation framework
- The last sub activity will be the ***selection of pilot area***. The consultant will study the existing GIS & MIS implementation of Excise and Taxation department. The study will include understanding of existing spatial and non-spatial technologies being implemented by the department. For the pilot area the department has agreed on areas selected with in the districts of Kohat and Peshawar to cover sample areas from a large & medium city to make the model applicable across province. Once the specific pilot area within the districts is selected, the consulting firm will request Excise and Taxation department for sharing the available GIS and MIS data. The boundary of the pilot area will be demarcated using open-source GIS software such as Quantum GIS. A circle / ward of containing approximately 2000 properties in Peshawar & 1000 properties in Kohat will be chosen.

▪ III.1.2 Property Valuation Framework Development

- Based on the literature review and world best practices, the factors to determine property valuation will be selected.
- Theoretical property valuation framework will be developed
- Gather / Extract data from other sources

Once the pilot area is selected, the consulting firm will start the process of extracting data from secondary sources for property valuation and comparison. The following steps will be taken:

a. Development of software / scripts to extract data from property websites:
b. Data entry from news paper
c. Get data from property transfer office

▪ III.1.3 Developing the Property Valuation Model

- The first step in this activity is the preparation of spatial data.
- As a next step, there would be analysis and data modelling using spatial analysis tools such as spatial PCA, Spatial Regression or Econometrics to extract the parameters.
- The model will be coded into a software.
- Integration of gathered data with existing GIS-PTIS properties

- Later, the consulting firm will made a presentation of the model to the client for feedback and refinement

III.1.4 Field verification & model finalization

- In the last step, the model was developed and property valuation was generated for pilot areas. In this step random field survey will be conducted to test and refine the model.
- The consulting firm will refine and finalize the model after field survey.

III.1.5 Feedback incorporation and finalization

- The last step will be to get the feedback from client department and incorporate the feedback into the final model. The final report will also be submitted.

III.2 Cross-Cutting Task –Institutional Mechanisms, Organizational Arrangements, and Regulations for Embedment and Sustainability of GIS-Based Valuation System

Conversion to the GIS-based valuation system will have impacts on the institutional mechanisms where some of those will become redundant or counter-productive and thus will need to be replaced with the new approaches. This necessarily will have impacts on the organizational arrangements and thus the study will embark upon assessment of existing policies and regulations to align them with the requirements of GIS-Based valuation system. This will also entail working on development of proposals for sustainability and rolling out of the new system.

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