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RESEARCH PAPER

A Study of Implementation and Success of Building Bye-Laws in Lahore

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ABSTRACT

Building Regulations plays significant role in shaping the cities around the globe. The proper implementation and interpretation of these regulations in different parts of the world shaped some of the beautiful cities like Amsterdam and Copenhagen. The uncontrolled growth due to the ineffective planning rules and regulations in third world countries like Pakistan resulted into haphazard city planning. This research is focused on the identification of such factors that includes mainly social, economic and institutional in addition to the interpretations an implementation issues. The methodology adopted comprised of literature review followed by questionnaire surveys along with the socioeconomic and institutional studies. The data was further analyzed by SPSS to compile the results. The data concluded that public participation is mandatory for the effective enforcement of the building bye-laws. This research conclude with the recommendation strategy for proper implementation and interpretation of the Building Regulations for successful planning of the cities like Lahore in Pakistan.

Keywords: Building Bye-Laws, Planning, Sustainable Development, Urban

Introduction

Home of more than 12 million people with 2.4% accelerating growth rate has made the Lahore city second among the most populated cites in the country. Since the Mughal Era (1524-1752) up till now the development and management of city has been a challenge. walled city with winding narrow streets having cul-de-sac and dead ends having remarkable gardens followed by the British colonial period with urban planning concepts, wider roads and modern building design, beautify the city landscape has lead the city towards urban and regional center in every aspect of life. Housing need after partition created pressure on city administration to compromise on standards, integrated urban development, building byelaws enforcement, Building control and other relevant urban planning issues. City managers have to formulate number of policies/ rules and regulations and building byelaws to properly govern the city during different time period. But ineffective policies, inefficient building control, overlapping of jurisdictions of development authorities have lead the city towards an urban slum and among most polluted cities in the world. Urban planning can play its vital role for the city governance in terms of building byelaws. The potential of building control and byelaws in shaping the city towards sustainable development cannot be denied. The gaps in the byelaws in terms of zoning, Floor area ratio, floor space index and mandatory open space provision can be determined while studying their policy implication in different time frames in the past outlined with the prospective solutions as a way forward. The urban planning potentials to control and manage the city growth in terms of building byelaws prospects by the professionals, development agencies, regulatory authorities and city administration in its true sense is a way forward towards sustainable development.

Literature Review

Living in a healthy and secure society is a human condition. There are a variety of influential factors towards a city that is innocent, beautiful, and sounds good (Lee, 2016). These factors include the economy as well social values, political stability, transport networks and other resources. Despite this the main concerns of city planners are to control, monitor and manage the development of locals, through a set of applicable and by-laws (Asim et al., 2017). These parameters act the as efficient gear of the relevant authorities. Development control tools can be design rules, development plans, land use plans and building codes (Ahmed et al, 2019). The rules for building houses contain all the steps during construction the building of human security (Mayer & Somerville, 2000). Each program has two parts first to prepare once second implementation. Since our case study is in Lahore so preparation for the program is not a big deal though its implementation is far from satisfactory. The same goes for the rules of bye. We can clearly divide Lahore into many categories on the basis of creating bye rules or at least more various authorities have a responsibility to enforce the bye law in Lahore. Lahore Development Authorities, City Municipality officials and the Lahore Cantonment board, Cooperative Modal The whole Town Society has a set of relevant rules to regulate property management in their buildings. All these authorities have both good and bad points (LDA, 2019; Rana & Bhatti, 2018).

So the main focus of our research is to find out what the factors and causes are as a result any building codes that are used effectively or to clarify the reasons for that leads to their ban? In particular we want to find out the reasons for the gaps that exist in the implementation of various authorities in Lahore. In Lahore all the responsible authorities are different how to use their city rules to make a difference in it, which they do these authorities work well or not work well with each other, they are important. Creating bye-laws in particular including slope, building height, mandatory locations and pre-level construction direction, parking spaces, emergencies and fire, building texture and facade are also included create bye rules or build codes (Hansson, 2011; Shojai & Fattahi, 2021). The Lahore Development Authority is very much in control of the new development in Lahore and City Municipality officials are able to control the construction sites, Modal Town Area. Certainly if the building codes are applied successfully, this leads to a safe construction conditions and if not done properly and efficiently lead to three unorganized, diverse and dangerous societies.

Material and Methods

The research was carried out systematically following the steps shown in the comprehensive methodological plan as shown below in figure 1. The literature was studied for baseline studies data to correlate with the execution in the field. The gaps were identified and reconciled with the help of surveys conducted in the field. In this study, we utilized two types of research instruments:

1. Questionnaire
2. Interview Performa

Designing the Questionnaire: The questionnaires were designed with the respondents' mindset in consideration. Given that our respondents were local inhabitants of the area, we used simple language in the questionnaires.

Official Consultations: Prior to the field study, we plan to review the questionnaire and carry out a Performa interview with the appropriate authorities to confirm its effectiveness.

Surveys: The inclusion of stakeholders in any research is crucial. Incorporating the perspectives of those directly affected enriches our understanding. For our study, we have opted to implement two distinct survey techniques.

Socio-economic Research: To incorporate the views of the public in our research, we executed a socio-economic survey once we had established the sampling techniques and sample volume. These investigations enabled us to identify the obstacles that the public confronts, making it challenging for them to adhere to building regulations.

Institutional Studies: We carried out interviews with stakeholders in our relevant fields as a component of an institutional survey. These interactions allowed us to uncover deficiencies in enforcement methods and other key aspects crucial to the enforcement of building rules.

Data Entry: The data gathered from the socio-economic surveys was inputted into SPSS to prepare it for analysis. The information obtained during the interviews was categorized and then inputted into Excel, based on the remarks from the officials.

Analysis: As previously mentioned, since the data input was done via SPSS, the analysis was also conducted using the same software.

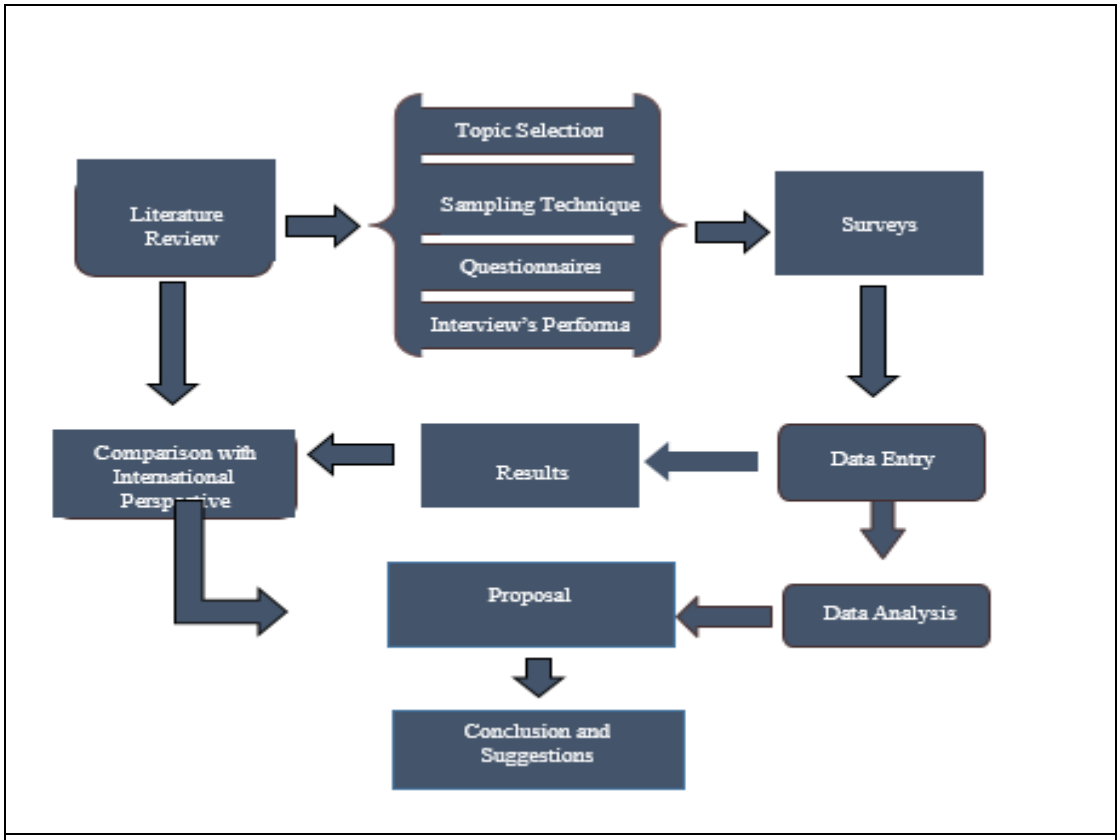

Figure 1: Comprehensive Methodological Plan (Author,2021)

Results and Discussion

The whole set of data was analyzed to prepare the consolidated results depicting the respondents point of view and their overall response to the city developments as shown in the Tables.

Public Questionnaire Analysis

Table 1

Effect of horizontal development in Pakistan

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Effect of horizontal development in Pakistan					
Percent	12%	46%	29%	10%	3%

The survey question pertains to the implications of horizontal development in Pakistan as shown above in Table 1. A significant majority, more than 46%, agreed that it is hazardous for Pakistan, while a mere 13% disagreed. Interestingly, 29% of the respondents were uncertain or lacked information on the issue.

Table 2

Changes in existing Bye-Laws required

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Changes in existing Bye-Laws required					
Percent	17%	35%	39%	4%	5%

The respondents were queried about their views on the current Bye-Laws - should they be altered or kept the same according to table 2. The data reveals that the majority, more than 50%, are in favor of updating these Bye-Laws. In contrast, a minor segment, just 10%, feels that the existing laws are adequate and should be left unchanged.

Table 3

Vertical development should be encouraged in houses

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Vertical development should be encouraged in houses					
Percent	24%	48%	24%	3%	1%

Vertical development should be encouraging or discourage specially in country like Pakistan (Table 3). As an under develop country it is the need of time that we should move towards vertical development and about 70% people of Lahore agree with this. However, a minor percentage, specifically 5%, hold opposing views, backed by their own arguments.

Table 4

FAR plays important role in healthy environment

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagre
FAR plays important role in healthy environment					
Percent	16%	49%	17%	17%	1%

FAR plays an important role in acquiring healthy living environment and safe residents from diseases (Table 4). And the 65% of the peoples think that yes the floor area ratio plays an important role for healthy and safe environment. Only 18% disagree with this. and 17% respondents remain undecided.

Table 5

WWR provide good ventilation in house

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
WWR provide good ventilation in house					
Percent	35%	38%	14%	13%	0%

We all know that how much window is important for the fresh air and ventilation of the houses, about 75% agree with this that yes it should be mandatory and only 13 % disagree with this they have their own arguments like AC and use of other electrical devices minimize this need although it's a long debate.

Table 6

Role of WWR in day light provision of house

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Role of WWR in day light provision of house					
Percent	14%	44%	35%	5%	2%

The Wall Window Ratio (WWR) is a known concept, emphasizing the significance of windows for ventilation and natural light in homes. As displayed in table 6, approximately 60% of people concur that implementing this should be obligatory. Conversely, a small fraction, about 7%, argue against this, citing the use of air conditioning and other electrical appliances as alternatives. However, this is a contentious issue, and a considerable 35% remain neutral due to lack of knowledge on the subject.

Authority Questionnaire Analysis

Table 7
Implementation of building Bye-Laws in the house

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Implementation of building Bye-laws in the house					
Percent	22%	37%	12%	19%	10%

Some housing societies have very strict rules on the implementation of building Bye-Laws, like, DHA, and Model town, no one can build a house against the Bye-Laws (Table 7). According to responses of people DHA and Model town implementation ratio is more than 90% in LDA its 60 % and in MCL the ratio is about 37%.in walled city its about 19 % houses are built according to Bye-Laws.

Table 8
Impact of Bye-Laws on the environment

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Impact of bye-laws on the environment					
Percent	39%	43%	9%	8%	1%

The houses which are not built according to building Bye-Laws can affect the environment in bad manners, in terms of ventilation, fresh air, and many other ways, we asked to the represents of different authorities to give us their response on this. According to table 12 the results shows that 82% of people are agree with this and only 9% responses think that it's not true and disagree with this.

Table 9
Reasons for the failure of by laws in the authority

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Reasons for the failure of by laws in the authority					
Percent	27%	32%	33%	8%	0%

There are many factors that are causing trouble in the implementation of Bye-Laws within different societies, like lack of awareness, political interference, conflict of interest, no public willingness, and like this many others and these troubles vary from place to place, and the results of our responses as per table 9 show that 8 % peoples thinks that there is a lack of awareness in communities, 27 % peoples think that political interference is a major factor, whereas 32% peoples think that conflict of interest is a major issue, and 33 % people think that no public willing ness major problem.

Table 10
Access of bye-laws for the peoples

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
Access of bye-laws for the peoples					
Percent	40%	7%	25%	21%	7%

This question is about is the accessibility of the public to Bye-Laws and other building codes, and how easily one can get the Bye-Laws of their society, it can be on websites, any book, newspaper, or on software, 40% of respondents as shown above in table 10 told us that their whole data can be found on a particular website, 25 % people told us that their Bye-Laws can be found on a book. As we know that there are 4 main authorities in Lahore which regulate building bye-laws in their respective control areas. They all have different sets of building codes, so it is very important to find out the difference between these codes before collecting field data. The comparison was made simply by drawing up comparative tables of the provisions of the laws and the system of execution of the relevant powers. Copies of construction documents

Lahore Development Authority

Urban development and planning in South Asian cities heavily rely on city development authorities. Both Pakistan and India have a shared history of Town Improvement Trusts, established by the British, evolving into Development Authorities. These institutions shared a common goal - enhancing city living standards through planned development. Specifically, Development Authorities were designed to carry out comprehensive and integrated master planning, a task their predecessor, set up as a Trust, failed to accomplish due to rapid urbanization. The Lahore Improvement Trust was the primary department concerned with these matters since Pakistan's inception in 1947. Building Bye-Laws were established through the Lahore Improvement Trust until 1975 when the Lahore Development Authority was formed. However, various changes have been implemented over time. Lahore municipal corporation (1947-1967), The development authority act (1949), Basic democracies order (1959), Lahore improvement trust (1967-1975), Lda building regulation 1975, Lda building regulation 1984, Lda building amendment bill 2007, Lda building law 2014 and Lda building regulation 2019.

According to LDA Building Regulations 1975

The Lahore Development Authority Act 1975 (Act No XXX of 1975) was enacted to establish the Lahore Development Authority. The Act's preamble states that it is necessary for the public good to create a comprehensive metropolitan planning and development system to enhance the quality of life in Lahore's metropolitan area. This system aims to establish an integrated metropolitan and regional development approach, a continuous planning and development process, and to ensure the optimal use of resources, economical and effective land use, and the development of traffic, transportation, health, education, water supply, sewerage, drainage, solid waste disposal, and related matters (Landuse regulation, 2008).

According to LDA Building Regulations 1984

The architectural design of the building, including all levels and the basement (if applicable), must be illustrated with plans, sections, and elevations. These illustrations should be drawn to a minimum scale of 1 inch to 8 feet (1:100). However, if the building's size necessitates a smaller scale, the scale should not be less than 1 inch to 16 feet (1:200). These plans and sections should clearly specify the intended use of the building or its parts in addition to access routes to and from various parts of the building and its attachments, as well as the location, dimensions, and ventilation methods. The plans should provide details about the depth and type of the foundations, the proposed plinth level and superstructure at each floor level, and the dimensions and specifications of all walls, floors, roofs, columns, beams, and joists that will be incorporated into the walls, floors, and roofs of the building (Ahmad, 2019).

According to LDA Building Regulations 2007

For any residential structure that isn't an apartment building and is adjacent to roads with a Right of Way up to 25 feet, the maximum height from the road's crown to the top of the parapet wall should not surpass 38 feet (11.58 meters). Additionally, each floor level, excluding the basement, should maintain a minimum clear height of 9 feet 6 inches (2.9 meters), measured from the finished floor to the underside of the roof slab above (Table 11 and 12) (LDA Bye-Laws, 2007).

Table 11
According to LDA Building Regulations 2007

Plot Size	Max No. of /Storey (excluding basement)	Max Ground Coverage	Max Height	Max FAR	Minimum Parking Provision
Less than 3-Marla	2	85%	25 ft	1:2	Optional
5 Marla & above but less than 10 Marla	3	80%	40 ft	1:1.6	Optional
10 Marla & Above but less than 1 Kanal	5	70%	60 ft	1:1.5	Optional
1 Kanal & above less than 2 Kanals	5	65%	60 ft	1:1.4	Optional

Table 12
Mandatory Open Spaces

Plot Size	Front Space	Rear Space	Side Space
Less than 5-Marla	5 ft.	Not required	Not required
5 Marla & above but less than 10 Marla	5 ft.	5 ft.	Not required
10 Marla to 30 Marla	10 ft	7 ft.	5 ft
Above 30 Marla but less than 2 kanal	10 ft	7 ft	5 ft
2 kanal& above	20 ft	10 ft	10 ft

In approved schemes or controlled areas, an apartment building on a residential plot can have up to seven storeys, excluding the basement. Each storey, apart from the basement, should have a minimum clear height of 9 feet 6 inches (2.9 meters), measured from the finished floor level to the underside of the roof slab above. The maximum height of any apartment building in these areas, measured from the crown of the road to the top of the parapet wall, should not exceed 80 feet. This does not include chimney stacks, lift heads, and water towers.

Table 13
According to LDA Building Regulations 2014

Plot Size	Max No. of Storey (excluding basement)	Max Ground Coverage	Max Height	Max FAR	Minimum Parking Provision

Less than 5-Marla	3	80%	38 ft	1:2.4	Optional
5 Marla & above but less than 10 Marla	3	75%	38 ft	1:2.3	Optional
10 Marla & Above but less than 1 Kanal	4	70%	45 ft	1:2.8	Optional
1 Kanal to 30 Marla	4	65%	45 ft	1:2.6	Optional

Table 14
Mandatory Open Spaces

Plot Size	Front Line	Rear Space	Side Space
Less than 5-Marla	5 ft	7ft	Not required
5 Marla & above but less than 10 Marla	5 ft	5 ft	Not required
10 Marla & Above but less than 1 Kanal	10 ft	7 ft	5 ft on both side
1 Kanal to 30 Marla	10 ft	7 ft	5 ft side on both
2 kanals & above	10ft	7 ft	15 ft

According to DHA Building Regulations 2014

In Phases 1 to 4, residential buildings should not surpass a height of 30 ft from the road. For Phases 5 and beyond, the buildings can reach up to 35 ft. The ceiling of the living room should be no lower than 9.5 ft and no higher than 12 ft. The basement ceiling should maintain a height between 9 ft and 10 ft. The car porch should have a minimum height of 9 ft, but it should not exceed the height of the ground floor (DHA construction development 2014, 2014). The different plot sizes are 5 (clear spaces are 5x5x3) , 7 (clear spaces are 7x3x3), 8 (clear spaces are 8x4x4) and 10 marla (clear spaces are 10'-9"x5'-4.5"x5-4.5") and one kanal (clear spaces are 15'-9"x5'-4.5"x5-4.5"x5-4.5") with open surrounding spcaes.

The car porch should have a depth ranging from 12 feet (not including the 2-foot projection) to a maximum of 18 feet. Building carport columns using regular boundary walls is not allowed. In DHA Lahore, **for 5 Marla plots,** the first floor's covered area can be equivalent to the ground floor's permissible area. But for **10 Marla**, **1 Kanal, and 2 Kanal** properties, the first floor's covered area should not surpass 75% of the ground floor's covered area. Only basements with a single story are allowed in residential zones. The Defense Housing Authority has approved a 2-foot-wide roof projection with a 6-inch dropdown. The boundary wall can be up to 7 feet high. After getting a no-objection certificate from the neighboring houses, an electric wire fence up to 2 feet high can be installed on the boundary wall. However, the total height of the structure (wall plus fence) should not exceed 9 feet.

Model Town Lahore

Model Town is a residential suburb in Lahore, Punjab, Pakistan, situated adjacent to Faisal Town, Gulberg, Garden Town, and Township suburbs. A preliminary committee of 21 members, led by Khan Bahadur Sir Sh. Abdul Qadir, was established to draft the Bye-Laws and perform other essential tasks related to the society's formation. Consequently, The Cooperative Model Town Society Limited was established and registered under the Cooperative Societies Act II of 1912 in 1924 (Bye-Laws Coeprative Model Town Society Lahore, 1962). The society's main objectives were:

1) To envision, design, develop, and maintain a garden town.

2) To purchase or acquire land, buildings, and other movable and immovable properties.
3) To offer services and build, manage, and maintain various types of infrastructure for the convenience and benefit of the resident members.
4) To sell, mortgage, and lease land, houses, buildings, and all movable or immovable properties as required to achieve the society's objectives.
5) To construct residential houses and other buildings for private and public use and for the convenience of members.

Table No 15
Summary of Model Town Bye-Laws 2019

Plot Size	Max No. of Storey (excluding basement)	Max Ground Coverage	Max Height	Max FAR	Minimum Parking Provision
10 Marla & Above but less than 1 Kanal	4	70%	45 ft	1:2.8	Optional
1 Kanal to 3 Marla	4	65%	45 ft	1:2.6	Optional
Above 30 Marlas but less than 2- kanals	4	60%	45 ft	1:2.4	Optional

Metropolitan Corporation Lahore (MCL)

For a building that is adjacent to roads with a right of way up to 25 ft (7.62 m), the building line should align with existing buildings. However, for side and rear spaces, a specific table should be applied. The height of any residential building, other than an apartment, with a plot area up to 2250 sq. ft. should be considered (Table 16).

Buildings that are adjacent to streets with a right-of-way of up to 25 feet, as measured from the road's crown to the top of the parapet wall, should not surpass a height of 38 feet (11.58 m) as per the approved plans. Furthermore, each story of the building, excluding the basement, should maintain a minimum clear height of 9 feet 6 inches (2.9 m), measured from the finished floor level (Table 16).

For any residential building with a floor area exceeding 2,250 ft, except for apartment buildings adjacent to streets with a right-of-way over 25 feet (measured from the road's crown to the top of the parapet wall), the maximum height should not surpass 45 feet (13.71 m) as per the approved plan. Moreover, each floor, excluding the basement, should maintain a minimum clear height of 9 feet 6 inches (2.9 m), measured from the level of the finished floor to just below the top plate of the roof (Table 16). (Author, Mcl@lahore.com, 2021).

Table No 16
Summary of MCL Bye-Laws

Plot Size	Max No. of Storey (excluding basement)	Max Ground Coverage	Max Height	Max FAR	Minimum Parking Provision

Less than 3 Marla	2	85%	25 ft	1:02	Optional
Less than 3 Marla	3	80%	40 ft	01:01.6	Optional
10 Marla & Above but less than 1 Kanal	5	70%	60 ft	01:01.5	Optional
1 Kanal and above but less than 2 kanal	5	65%	60 ft	01:01.5	Optional
2- kanals and abvoe	5	60%	60 ft	01:01.3	Optional

Walled City Lahore Authority

Under the authority granted by Section 50 of the Walled City of Lahore Act, 2012 (XXXVI of 2012), the Authority is pleased to establish the following regulations with the prior approval of the Government (Table 17). The exterior elements of newly constructed buildings should align with or be acceptable interpretations of the heritage value in the Walled City. The Authority may not permit the subdivision of a plot less than five Marlas. The subdivision of plots of ten Marlas or more but less than one Kanal is permissible, provided that the space requirements of the original plot are met and the subdivision plan is approved by the Authority. The resulting subdivided plot, under clause (2) of this regulation, should not be less than five Marlas (209.14 square meters). The subdivision of plots of one Kanal (836.55 square meters) or more is permissible, subject to the fulfillment of space requirements of the original plot and prior approval of the subdivision plan from the Authority. The resulting subdivided plot, under clause (4) of this regulation, should not be less than ten Marlas (418.28 square meters) (WCLA ACT 2012, 2012).

Table 17

Summary of WCLA Bye-Laws

Plot Size	Max No. of Storey (excluding basement)	Max Ground Coverage	Max Height	Max FAR	Minimum Parking Provision
Less than 2-Marla	3	100%	50 ft	1:4	Optional
2 Marla & above but less than 5 Marla	3	90%	50 ft	1:3.5	Optional
05 Marla & Above but less than 10 Marla	3	80%	50 ft	1:3	Optional
10 Marla & Above	3	70%	50 ft	1:2.5	Optional

The exterior elements of newly constructed buildings should align with or be acceptable interpretations of the heritage value in the Walled City. The Authority may not permit the subdivision of a plot less than five Marlas. The subdivision of plots of ten Marlas or more but less than one Kanal is permissible, provided that the space requirements of the original plot are met and the subdivision plan is approved by the Authority. The resulting subdivided plot, under clause (2) of this regulation, should not be less than five Marlas (209.14 square meters). The subdivision of plots of one Kanal (836.55 square meters) or more is permissible, subject to the fulfillment of space requirements of the original plot and

prior approval of the subdivision plan from the Authority. The resulting subdivided plot, under clause (4) of this regulation, should not be less than ten Marlas (418.28 square meters) (WCLA ACT 2012, 2012).

Conclusions

The significance of building regulations in spatial planning is unquestionable. This study identifies the factors that enable authorities to effectively implement building regulations within their jurisdiction. The implementation process involves both the general public and the organizational behavior of the authorities. Our hypothesis suggested that the implementation of building regulations across various regions is influenced by social, economic, and institutional factors. These factors significantly affect the status of house plan approval. Our analysis concluded that the approval of a house does not depend on the profession of the individual responsible for its construction. All our other assumptions were confirmed to be accurate. This study includes four main authorities responsible for enforcing building regulations in Lahore. Our findings indicate that Lahore has an effective model city society. This is attributed to their small control area with a lower population density. They ensure public participation in every new building code decision, a system that mirrors successful international examples. The Lahore Development Authority, our third authority, has a well-established administration. However, corruption hinders effective implementation. Additionally, they oversee a large control area with high population densities. In conclusion, no authority can enforce its system without public cooperation. The success of international authorities and the model town society is a testament to this. The flexibility observed in the LCB system contributes to effective implementation. Meanwhile, the LDA boasts a robust institutional infrastructure and a team of professionals.

Recommendations

In the decision-making process, authorities should ensure that the public has ownership. This not only fosters public admiration but also aligns with practices in developed countries. Adopting a model similar to municipal cooperatives can enhance system efficiency by involving the general public in decision-making. For instance, at MCS, they actively engage the public, listen to their opinions, and take them into account before modifying existing regulations. By embracing this approach, we can enhance the functioning of other authorities.

Building regulations should be updated according to the current needs of the area. Needed to update the statutes with a certain interval. Updating the statutes is important improving building performance standards as well as adapting to new ones technologies in their implementation system.

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