Jurnal KORIDOR
Journal homepage: https://talenta.usu.ac.id/koridor/

Commercial-Induced Layout Changes in Type 36 Houses Along Jalan Karya I, UIR Campus Area

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ARTICLE INFO
Article history:
Received 26 February 2026
Revised 29 May 2026
Accepted 29 June 2026
Available online 30 June 2026

E-ISSN: 2721-3463
P-ISSN: 2086-910X

How to cite:
Herdiansyah, A., Nurdin, A. H., & Atika, M. Y. (2026). Commercial-Induced Layout Changes in Type 36 Houses Along Jalan Karya I, UIR Campus Area. Jurnal koridor: 17(1), 055–066.

http://doi.org/10.32734/koridor.v17i1.23350

ABSTRACT
The proliferation of commercial activities around university campuses has triggered significant spatial transformations in adjacent low-cost housing, particularly the Type 36 (36 m²) unit — a dwelling type whose extreme spatial economy leaves no functional buffer between domestic and commercial zones. When commercial pressure is applied to this minimal typology, conflicts are immediate and irreversible: the sole living room is converted into a retail space, semi-public terraces are permanently enclosed as kiosks, domestic circulation corridors double as service counters, and canopies originally absent from the design are bolted across the entire building frontage — eliminating setbacks, encroaching on pedestrian footpaths, and violating the Building Setback Line (GSB) and Building Coverage Ratio (KDB) stipulated under Indonesian spatial planning regulations. This study investigates the nature, typology, and broader implications of these spatial transformations in Type 36 houses along Jalan Karya I, Pekanbaru City, within the catchment of the Islamic University of Riau (UIR) campus. Using a descriptive-qualitative approach with rationalistic analysis, data were collected through field observation, paired architectural sketch documentation, and structured interviews with 17 purposively sampled homeowners from a population of 110 commercially-converted units identified across 465 surveyed dwellings. The study's objectives are: (1) to identify typological patterns of spatial layout change; (2) to analyse the economic, social, and locational drivers of conversion; and (3) to evaluate the physical, regulatory, and environmental consequences of these transformations. Findings identify two conversion typologies — complete conversion (10 units) and major partial conversion (7 units) — and reveal systematic regulatory non-compliance, loss of residential privacy, pedestrian obstruction, and streetscape degradation. The study concludes with architectural and policy recommendations for managing commercial conversion in campus-adjacent low-cost housing areas.
Keyword: Changes in the layout of residential, residential and commercial.

ABSTRAK
Maraknya aktivitas komersial di sekitar kampus universitas telah memicu transformasi spasial yang signifikan pada perumahan berbiaya rendah di sekitarnya, khususnya hunian Tipe 36 (36 m²) tipe rumah yang ekonomi spasialnya sangat ketat sehingga tidak menyisakan ruang penyangga antara zona domestik dan komersial. Ketika tekanan komersial diterapkan pada tipologi minimal ini, konflik terjadi secara langsung dan sulit dibalik: satu-satunya ruang tamu dikonversi menjadi ruang ritel, teras semi-publik ditutup permanen menjadi kios, koridor sirkulasi domestik merangkap sebagai area pelayanan, dan kanopi yang semula tidak ada dalam desain awal dipasang menutupi seluruh muka bangunan — menghilangkan sempadan, melampaui jalur pejalan kaki, dan melanggar Garis Sempadan Bangunan (GSB) serta Koefisien Dasar Bangunan (KDB) yang diatur dalam regulasi tata ruang Indonesia. Penelitian ini mengkaji sifat, tipologi, dan implikasi yang lebih luas dari transformasi spasial tersebut pada

rumah Tipe 36 di sepanjang Jalan Karya I, Kota Pekanbaru, dalam jangkauan kampus Universitas Islam Riau (UIR). Dengan menggunakan pendekatan deskriptif-kualitatif dan analisis rasionalistik, data dikumpulkan melalui observasi lapangan, dokumentasi sketsa arsitektural berpasangan, dan wawancara terstruktur dengan 17 pemilik rumah yang dipilih secara purposif dari populasi 110 unit yang telah dikonversi secara komersial, yang teridentifikasi dari 465 unit hunian yang disurvei. Tujuan penelitian adalah: (1) mengidentifikasi pola tipologi perubahan tata letak ruang; (2) menganalisis faktor pendorong ekonomi, sosial, dan lokasional dari konversi tersebut; serta (3) mengevaluasi konsekuensi fisik, regulatif, dan lingkungan dari transformasi ini. Temuan mengidentifikasi dua tipologi konversi konversi penuh (10 unit) dan konversi parsial besar (7 unit) serta mengungkap ketidakpatuhan regulasi yang sistematis, hilangnya privasi hunian, gangguan terhadap pejalan kaki, dan degradasi kualitas lingkungan jalan. Penelitian ini ditutup dengan rekomendasi arsitektural dan kebijakan tata ruang untuk pengelolaan konversi komersial di kawasan perumahan berbiaya rendah yang berdekatan dengan kampus.
Kata Kunci: Perubahan tata letak ruang, Perumahan, Komersial.

1. Introduction

Population density in Riau Province reached 74.81 people/km² in 2024, with Pekanbaru City recording the highest figure at 1,608.37 people/km² (BPS, 2024). This growth is driven primarily by rural-to-urban migration motivated by access to higher education and formal employment, generating a persistent demand for affordable housing that the government and private sector have met through standardised low-cost housing programmes (perumnas) and real estate schemes.

Among prevailing housing typologies in Indonesian cities, the Type 36 — characterised by a building footprint of 36 m² on a land plot of approximately 60 to 72 m² — represents the most spatially constrained form of mass-produced shelter. This typology carries critical architectural implications: its extreme spatial economy means that any functional conversion produces immediate and irrecoverable losses of domestic space. Unlike larger typologies where a garage or secondary room can be repurposed while the residential core remains intact, in a Type 36 unit the conversion of the front room directly eliminates the only living space. Semi-public terraces become enclosed retail kiosks. Domestic circulation corridors double as service counters. Canopies, absent from the original design, are retrofitted across the entire building frontage — erasing setbacks, encroaching on pedestrian footpaths, and violating building regulations. This irreducible spatial conflict between the domestic minimum and the commercial imperative constitutes the core problem this research addresses.

The study area, Jalan Karya I in Air Dingin Village, Bukit Raya District, Pekanbaru City, is situated within the immediate catchment of the Islamic University of Riau (UIR) campus. The concentration of students and campus workers generates sustained demand for food stalls, laundry services, stationery retailers, and affordable boarding accommodation, all of which exert continuous commercial pressure on adjacent Type 36 housing. Understanding how this pressure translates spatially is essential for architectural practice, urban housing policy, and the management of campus-adjacent residential environments.

Several previous studies have documented analogous phenomena across Indonesian cities, constituting the state of the art against which this research positions itself. Hermin et al. (2015) identified systematic front-room conversion in residential streets near commercial corridors in Semarang. Wiryawan (2020) documented comparable patterns around Universitas Brawijaya in Malang, establishing the campus as a direct economic generator of residential transformation. Muhajir and Hantono (2023) observed that campus buffer-zone buildings in Depok progressively lost their residential character through incremental commercial accretion. Mapilindo et al. (2022) confirmed this dynamic in Greater Jakarta, noting that mixed-use transformation was most aggressive in low-cost housing segments precisely because their spatial margins for functional separation were smallest. At the international level, Turner (1972) and Mangin (1967) established foundational frameworks for understanding incrementally modified self-built housing in contexts analogous to Indonesian urban conditions. More recently, Agustina and Beiley (2022) demonstrated, across a comparative study of Indonesian cities, that informal commercial encroachment in residential zones correlates strongly with campus proximity and inadequate formal commercial provision. Lestari and Pradono (2022) further showed that home-based enterprises in Indonesian kampungs follow a sequential spatial logic — first the front terrace, then the front room, then the permanent structural integration of commercial canopies and signage. Despite this body of literature, a specific gap remains: no study has examined the Type 36 typology as a distinct morphological category with its own particular spatial constraints. By focusing exclusively on this most-minimal standardised

dwelling form, this study makes a novel contribution to the understanding of residential morphological change in campus-adjacent Indonesian cities.

Theoretically, the study builds on Rapoport's (1969) framework of house form and culture, which holds that spatial organisation is not a neutral technical outcome but a direct expression of occupants' social, economic, and cultural values. Applied here, commercial conversion is understood not as mere renovation but as a fundamental reorientation of the home's symbolic identity — from a private retreat to a productive economic interface. Lang's (1987) concept of the latent function of roads — as generators of economic opportunity gradients that organise land use along their edges — explains the consistent directionality of conversion observed in the field: always from the street face inward. Pradono and Sugiarto (2021) developed a spatial typology of campus-adjacent residential morphology specific to Indonesian secondary cities, while Nurdiani (2022) demonstrated that conversion intensity correlates with proximity to the campus gate. Together, these frameworks provide a theoretically grounded basis for the typological and critical spatial analysis that follows.

The objectives of this research are threefold: (1) to identify the typological patterns of spatial layout change including interior room reconfigurations, façade modifications, and changes in building orientation resulting from commercial conversion in Type 36 houses along Jalan Karya I; (2) to analyse the economic, social, and locational drivers that motivate homeowners to undertake these conversions; and (3) to evaluate the physical, regulatory, and environmental consequences of these transformations, including their implications for residential privacy, regulatory compliance, pedestrian safety, and overall settlement quality.

2. Method

This study employs a descriptive-qualitative method with a rationalistic analysis framework. Qualitative-rationalistic approaches are appropriate when the research objective is not to test statistical hypotheses across a large population but to achieve a deep, contextually grounded understanding of spatial phenomena (Groat & Wang, 2013). Rather than processing data solely in tabular form, this framework allows findings to be interpreted through architectural reasoning, contextual argumentation, and spatial logic — which is essential when the unit of analysis is the spatial configuration of individual buildings.

2.1 Research Variables

The research variables are organised into two categories: physical and non-physical.

Physical variables concern the spatial and formal characteristics of the buildings:

Interior layout: changes to room configuration, including elimination of rooms, subdivision of spaces, and creation of new functional zones;

- Exterior layout: changes to the façade, including addition of canopies, enclosure of terraces, installation of signage, and alteration of entrance configurations;
- Building mass and orientation: changes to the volumetric form and directional relationship of the building to the street.
- Non-physical variables capture the socio-economic and regulatory context:
- Economic factors: type of business, capital source, market target, income scale;
- Regulatory factors: awareness of and compliance with GSB, KDB, and other building regulations;
- Social factors: household composition, tenure status, and the decision-making process for conversion.

2.2 Population and Sampling

The research commenced with a comprehensive field survey of the broader study area, covering two neighbourhood associations (Rukun Warga, RW): RW 05 (208 residential units) and RW 13 (257 residential units), totalling 465 units. This survey mapped the full extent of commercial conversion and established the research population. Of the 465 units, 110 (23.6%) had undergone some form of commercial conversion — constituting the accessible study population.

From this population of 110 converted units, 17 houses were selected as primary samples through purposive sampling — the deliberate selection of cases that best represent the range of phenomena under study. Purposive sampling is methodologically appropriate when the objective is typological identification rather than statistical generalisation (Creswell, 2014; Tongco, 2007). Selection criteria were: (a) representativeness of the full range of conversion types; (b) variation in business type; (c) variation in tenure status; and (d) physical accessibility and willingness of the occupant to participate. This procedure is explicitly purposive, not a census; a census, by definition, includes all members of a population. The present study selected 17 units from a population of 110, representing approximately 15.5% of the converted-house population.

2.3 Data Collection and Spatial Analysis

Data were collected through: (1) structured field observation using a spatial documentation protocol; (2) paired architectural sketch drawings; and (3) structured interviews. For each of the 17 sample units, the observation protocol recorded the original Type 36 floor plan (inferred from standard plan specifications), current room count and functions, dimensions, nature of façade modifications, and the spatial relationship between building and street (setback, visual permeability, commercial entrance orientation). Paired 'before and after' sketch plans constitute the primary spatial evidence for typological classification. Spatial analysis proceeded in two stages: typological classification of the 17 units by extent of transformation, followed by interpretation of spatial patterns in relation to the non-physical variables collected through interviews.

2.4 Research Location

The study was conducted along Jl. Karya I, Air Dingin Village, Bukit Raya District, Pekanbaru City, within Development Zone (WP) IV, which encompasses education, trade, and industry. The area lies immediately adjacent to the UIR campus, to the east of the city centre.

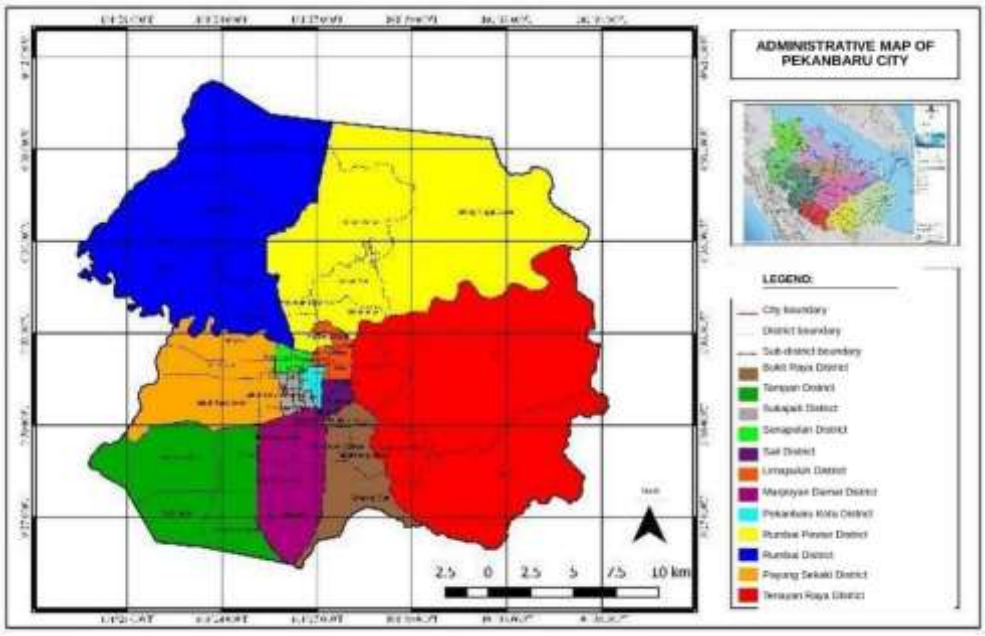


Figure 1. Map Pekanbaru City
Source : https://memorabilia.perpustakaanterbaik.com

3. Discussion

3.1 Scale and Pattern of Commercial Conversion

The field survey of 465 residential units established that 110 (23.6%) had undergone commercial conversion: 57 of 208 units in RW 05 (27.4%) and 53 of 257 units in RW 13 (20.6%). The detailed distribution is presented in Table 1.

Table 1. Houses Undergoing Commercial Conversions

Locations	Total Houses	Houses with Changed Function	Percentages	Dominant Type of Business
RW. 05	208 Unit	57 Unit	27,4 %	Stalls, kiosks and boarding houses
RW. 13	257 Unit	53 Unit	20,6 %	Shophouses, Kiosks, Boarding Houses, Food Businesses
Total	**465 Unit**	**110 Unit**	**23,6%**	

3.2 Typological Classification of Spatial Layout Changes

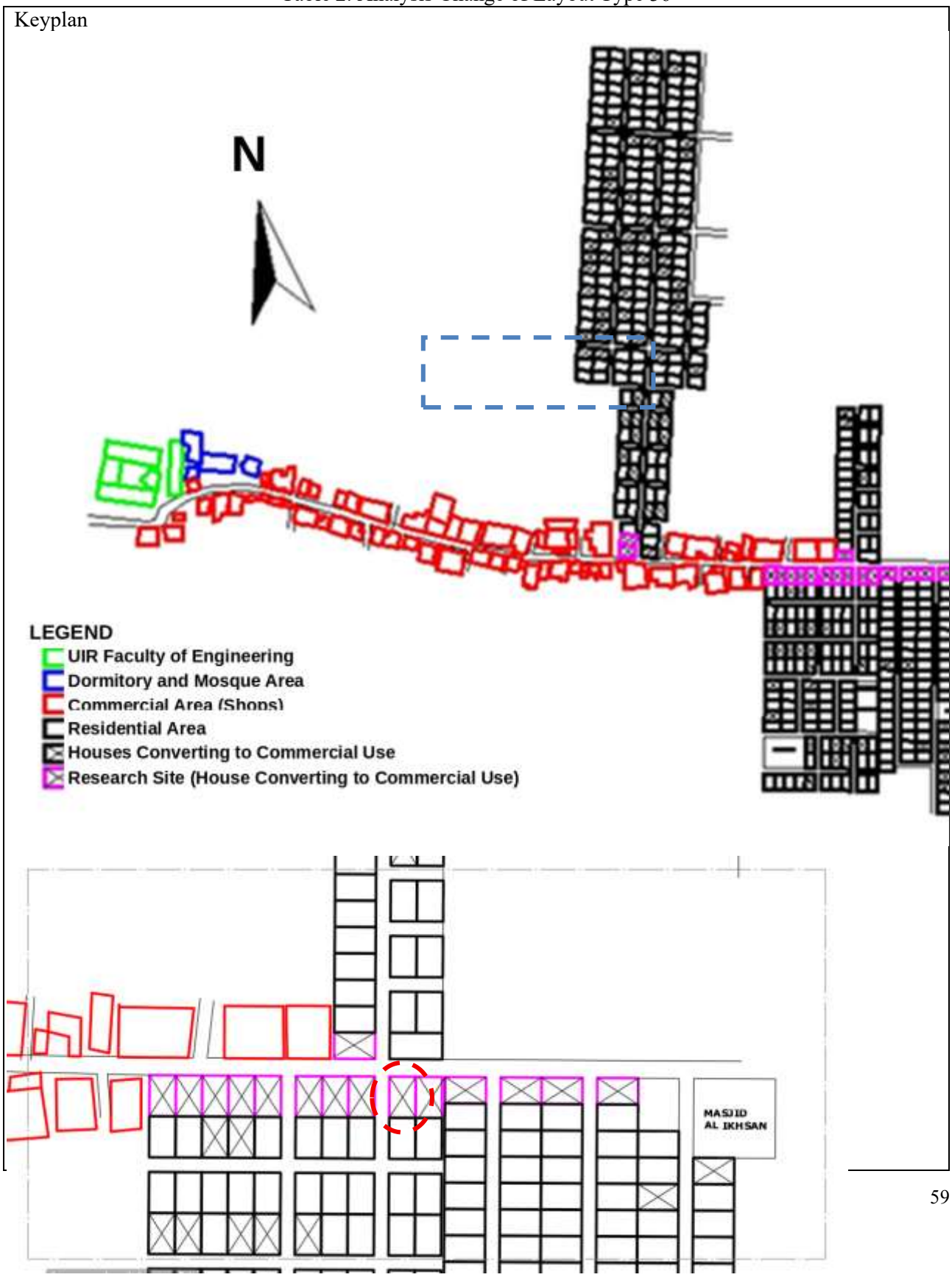
The 17 purposively sampled units were classified into two transformation typologies based on in-depth spatial observation and paired sketch documentation.

Typology A Complete Conversion (10 units). The entire building has been repurposed from residential to

commercial use. The standard Type 36 interior originally comprising a living room, one to two bedrooms, a kitchen, and a bathroom has been entirely reorganised. In shophouse conversions, the front room and former living room are merged into a single open retail space, partition walls are removed to create storage areas or service counters, and the facade is replaced with a full-width shopfront, roller shutter, and large commercial signage. In boarding house (rumah kos) conversions, the single-family spatial hierarchy is replaced by a multi-cell arrangement of small rental rooms accessed from a shared corridor a transformation that entirely erases the original domestic plan. In all Typology A units, the building setback has been eliminated: permanent canopies extend to or beyond the edge of the pedestrian footpath.

Table 2. Analysis Change of Layout Type 36

Keyplan



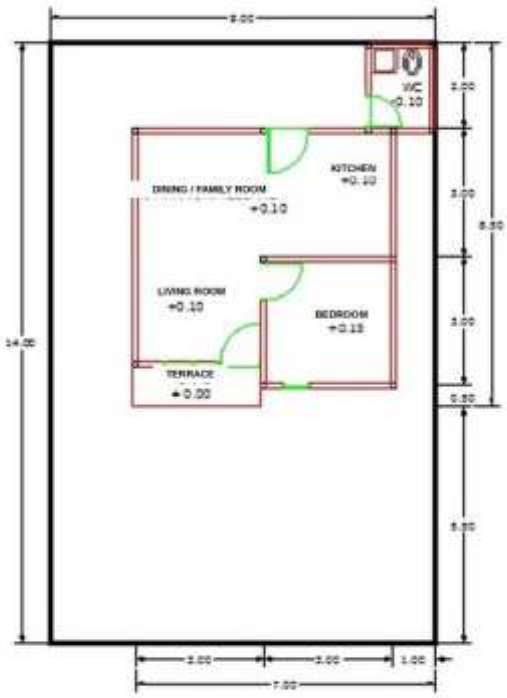
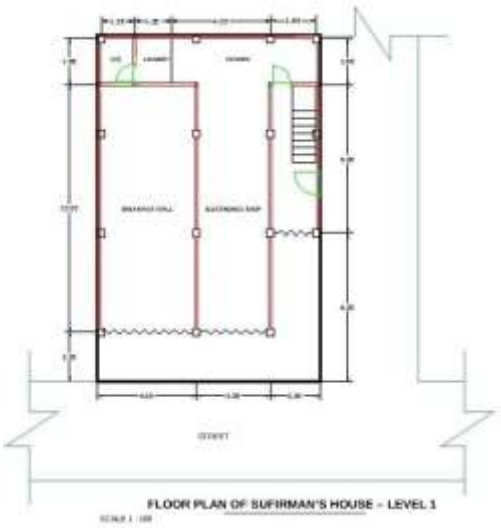
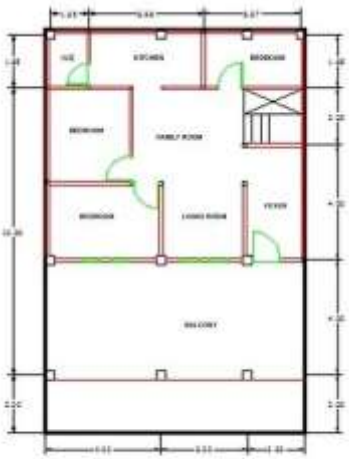
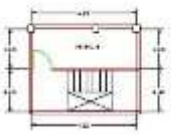
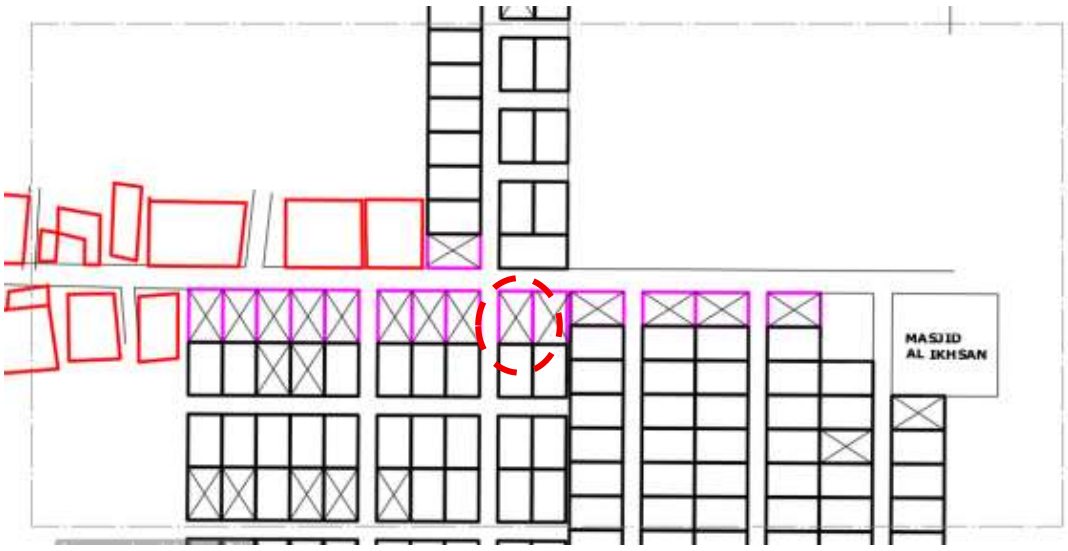
Before	After
 ORIGINAL FLOOR PLAN TYPE 36 M²	 FLOOR PLAN OF SUFIRMAN'S HOUSE – LEVEL 1  FLOOR PLAN OF SUFIRMAN'S HOUSE – LEVEL 2 

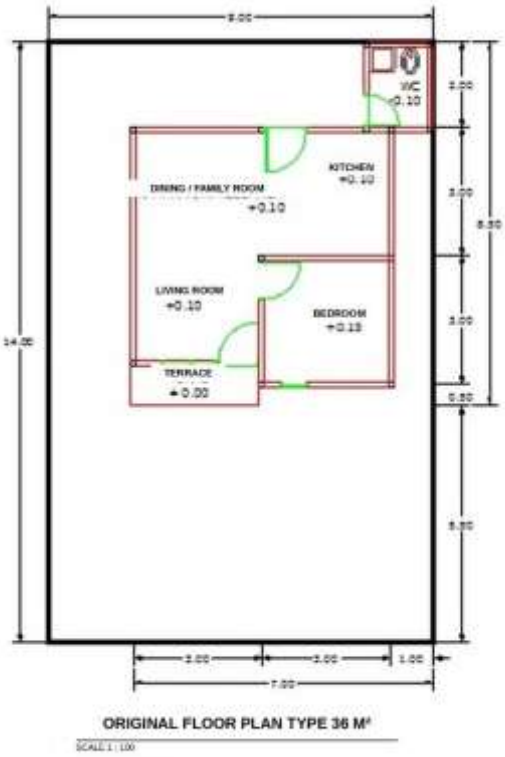
Figure 2. Photograph of the converted house (Typology A: complete conversion sample).

Typology B Major Partial Conversion (7 units). The building retains a residential core at the rear while the front portion the living room and terrace has been converted to commercial use. A clear front-to-back gradient from public to private is preserved: the commercial zone at the street face transitions through a semi-permeable threshold (typically a curtain or partial partition) to the domestic zone at the rear. Façade modifications include enclosure of the terrace with lightweight corrugated metal or polycarbonate sheeting and installation of signage above the original entrance. The domestic entrance is relocated to the side of the building or accessed through the commercial space a configuration that forces household members and customers to share the same threshold.

In both typologies, the direction of spatial transformation invariably follows the street axis — from the façade inward. This directional consistency confirms Lang's (1987) proposition regarding the latent economic function of roads: the street is not merely an infrastructural conduit but an economic gradient that organises land use along its edges, with maximum commercial pressure concentrated at the point of maximum street exposure.

Table 3. Analysis Change of Layout Type 36

Keyplan	
	
Before	After



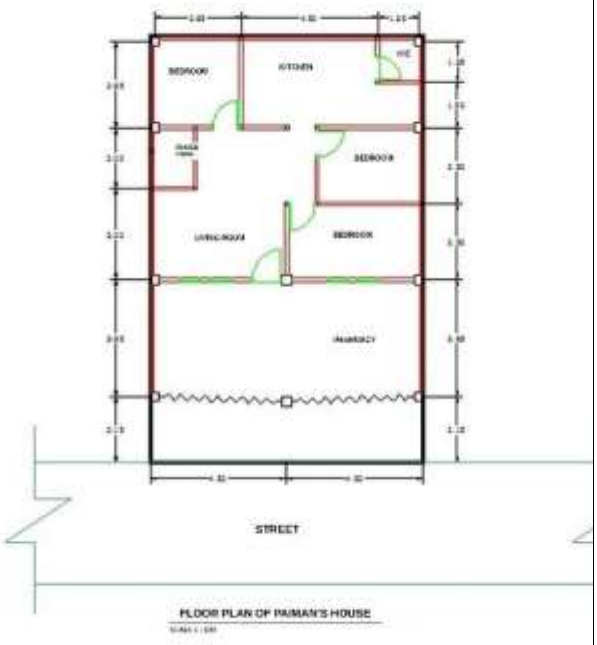


Figure 3. Photograph of the converted house (Typology B: major partial conversion sample).

3.3 Loss of Domestic Privacy: A Critical Spatial Analysis

The economic logic of conversion is well documented in the literature, but its spatial and psychological consequences for occupants require critical analysis that goes beyond simple percentage accounting. In the

Type 36 typology, the complete absence of spatial buffer between the public commercial zone and the private residential core produces a form of domestic spatial erosion that is qualitatively different from, and more severe than, what occurs in larger housing typologies.

In Typology A units, no private space accessible from within the house remains that is shielded from customers or clients. The kitchen typically the last space to be converted, given its functional indispensability frequently opens directly onto the service area. Family members conducting domestic activities are visible and audible from the commercial zone. Children's play areas, if they exist, are located either within the commercial space or in the narrow rear yard. The home, in Altman's (1975) terms, has lost its capacity to regulate social interaction the fundamental psychological function of the residential boundary. Rapoport's (1969) concept of the home as a 'value system made spatial' is inverted: rather than protecting the occupant's social identity and private life, the converted Type 36 becomes a space in which private life is permanently exposed to market relations.

In Typology B units, a nominal residential core survives at the rear, but its quality is severely diminished. The relocation of the domestic entrance to a side or rear position reduces natural light penetration to the remaining living spaces. Cross-ventilation, already minimal in the original Type 36 plan, is further disrupted by the enclosure of the front terrace. The shared threshold where household members and customers use the same entrance means that the spatial boundary between public and private is negotiated continuously through behavioural conventions (a curtain pulled across, a counter positioned diagonally) rather than through architectural form. These informal spatial devices are insufficient to provide genuine privacy, particularly for families with young children.

This analysis reveals that commercial conversion of the Type 36 typology does not merely transform a room or two; it fundamentally dismantles the architecture of domestic privacy. This finding has implications for housing policy: the incremental erosion of residential quality in Type 36 areas near campuses represents not only an individual household decision but a collective degradation of settlement character that warrants regulatory attention.

3.4 Regulatory Non-Compliance and Broader Environmental Impacts

The spatial transformations documented in this study carry implications that extend well beyond the individual building boundary. Three categories of broader impact are identified: regulatory non-compliance, corridor congestion and pedestrian safety, and general residential environment quality degradation.

Regulatory non-compliance. Under Indonesian spatial planning regulations, residential zones in Pekanbaru are governed by provisions including minimum building setback lines (Garis Sempadan Bangunan, GSB) and maximum building coverage ratios (Koefisien Dasar Bangunan, KDB). The GSB for the residential streets in the study area requires a minimum setback between the building's front wall and the road edge. Field observations revealed that the permanent canopies installed in all 10 Typology A units and the majority of Typology B units extend to or beyond the boundary of the pedestrian footpath, effectively eliminating the required setback. In several cases, canopy columns are planted directly on the footpath surface. Similarly, the enclosure of front terraces and the addition of semi-permanent lightweight structures increase the built footprint beyond the KDB limit prescribed for residential zones. None of the 17 sample households reported having obtained a revised Building Construction Permit (Izin Mendirikan Bangunan, IMB) to authorise these structural changes confirming that the conversions are not only regulatory violations but officially unrecorded. This finding is consistent with Alisyahbana and Firman's (2021) observation that informal building modification in Indonesian residential areas overwhelmingly occurs outside the formal permitting system, creating a persistent gap between the regulatory framework and the built reality.

Corridor congestion and pedestrian safety. Jalan Karya I functions as a primary access corridor to the UIR campus, carrying both vehicular traffic and pedestrian flows from students, staff, and service providers. The encroachment of commercial canopies onto the pedestrian footpath forces pedestrians onto the vehicle carriageway, creating a safety hazard that is compounded during peak campus hours. The conversion of residential front yards into parking areas for customers observed in the majority of Typology A units further reduces the effective carriageway width and contributes to localised congestion. These impacts are not incidental; they are the predictable spatial consequence of unregulated commercial conversion in a corridor whose road geometry was designed to serve a purely residential catchment.

Settlement quality degradation. The cumulative streetscape effect of the commercial conversions along Jalan Karya I constitutes a significant deterioration in the residential character of the neighbourhood. The replacement of uniform domestic façades with heterogeneous commercial signage, corrugated metal enclosures, and ad hoc canopy structures creates a visually fragmented streetscape. Green setback areas — originally part of the perumnas planning standard that required front yard planting have been entirely paved

over in most converted units to accommodate customer parking or display space. The acoustic environment has also changed: residential streets that were originally quiet during morning and late-evening hours are now characterised by the noise of commercial operations extending throughout the day and, in the case of food stalls and boarding houses, into the night.

3.5 Drivers of Spatial Transformation

Structured interviews with the 17 sample households identified three categories of drivers. Economic drivers are primary. The UIR campus generates a large, predictable, and sustained demand for student-oriented goods and services. Approximately 60% of sampled businesses explicitly identified students as their primary market. The campus functions as an economic gravity centre (Nurdiani, 2022): perceived commercial value increases with proximity to the campus gate. The self-funding rate (82%) indicates that homeowners judge the expected return sufficient to commit personal capital without external financing confirming that the economic calculus strongly favours conversion for properties in high-footfall campus-adjacent locations.

Tenure and ownership structure significantly influence the form of conversion. Of the 110 converted units in the broader survey population, 70% were owner-occupied. Owner-occupied units tend toward more extensive and permanent changes (Typology A), unconstrained by lease terms. Rented units tend toward more reversible adaptations (Typology B), as tenants are contractually restricted from structural modification.

Business type distribution reflects the diversity of campus-community demand: goods-trading businesses (grocery stalls, photocopy shops, stationery retailers) account for 48%; service businesses (laundry, salons, food stalls, boarding houses) for 32%; and mixed-use operations (owner lives at rear, operates business at front) for 20%. This distribution aligns with findings from Chandra and Widyahari (2023) for Udayana University and Agustina and Beiley (2022) for Indonesian cities generally.

Figure 4. Distribution of Business Types in Converted Houses along Jalan Karya I. Source: Andrie, 2026.

3.6 Theoretical Synthesis

The spatial transformations documented in this study can be theoretically synthesised through three complementary frameworks. Rapoport's (1969) framework of house form and culture establishes that spatial organisation is a direct expression of occupants' social, economic, and cultural values. The commercial conversion of Type 36 houses is therefore not merely a pragmatic renovation but a fundamental reorientation of the home's symbolic identity: from private refuge to economic interface. This shift is culturally and economically rational from the household's perspective, but its consequences loss of privacy, regulatory violation, environmental degradation are borne collectively by the neighbourhood. Bell et al.'s (1976) transactional interdependence model explains the self-reinforcing feedback dynamic: commercial conversion attracts more students and customers, which makes the street more commercially viable, which motivates further conversion. Turner's (1972) proposition that 'housing is a verb' an ongoing process of adaptation rather than a static product captures the incremental, household-driven nature of these changes. Taken together, these frameworks reveal that the Type 36 conversion phenomenon is not random or aberrant but follows a predictable morphological logic driven by economic rationality, spatial constraints, and feedback between built form and social behaviour.

4. Conclusion

This study has examined the spatial layout changes in Type 36 residential houses along Jalan Karya I, Pekanbaru, associated with commercial activities generated by the proximity of the UIR campus. The following conclusions, organised as theoretical and empirical contributions to architecture and urban planning, are offered.

First, the Type 36 typology constitutes a distinct and extreme case of residential morphological stress under commercial pressure. Unlike larger housing typologies, where functional conversion can occur without eliminating the residential core, the 36 m² floor area provides no spatial buffer: any conversion of the front room or terrace directly erases the private domestic zone. This finding establishes the Type 36 not merely as a size category but as a morphological thresholda dwelling type at which commercial conversion and residential function become mutually exclusive rather than spatially negotiable. This constitutes a novel contribution to the typological literature on residential morphological transformation in Indonesian cities.

Second, two distinct transformation typologies were identified: Typology A (complete conversion, 10 units) and Typology B (major partial conversion, 7 units). Both typologies follow an invariant directional logic — conversion proceeds from the street face inward confirming the primacy of roadside economic accessibility as a morphological driver (Lang, 1987). The typological framework developed here can be applied to analogous campus-adjacent low-cost housing areas in other Indonesian secondary cities, providing a replicable analytical tool for future research.

Third, the study reveals that commercial conversion of Type 36 units systematically dismantles the architecture of domestic privacy. The loss of spatial buffers, the forced sharing of thresholds between household members and customers, and the intrusion of commercial activity into formerly private domestic zones constitute a form of spatial harm that is qualitatively irreversible in Typology A units and only partially mitigated in Typology B units. This finding calls for greater attention to privacy as a design criterion in the evaluation of residential transformation, alongside the more commonly measured metrics of economic activity and physical change.

Fourth, the study documents systematic regulatory non-compliance: canopy encroachments violating GSB provisions, footprint expansions exceeding KDB limits, and structural modifications undertaken without revised building permits (IMB). The gap between the regulatory framework and the built reality represents a governance failure that produces collective costs — pedestrian safety hazards, corridor congestion, and streetscape degradation — for which individual households bear no formal accountability.

4.1 Limitations of the Study

This study is subject to several limitations that should be acknowledged. First, the purposive sample of 17 units, while sufficient for typological identification, does not support statistical generalisation to the broader population of converted units in Pekanbaru or other Indonesian cities. Second, the spatial documentation relied on freehand sketch drawings rather than measured survey drawings; the absence of precise metric plans limits the precision of dimensional analysis. Third, the study examined a single road corridor over a single fieldwork period and thus cannot account for temporal dynamics — specifically, whether conversions are accelerating, stabilising, or in some cases being reversed. Fourth, the regulatory analysis is based on field observation and self-reported interview data rather than official building permit records, which were not available for cross-referencing during the study period. Future research should address these limitations through longitudinal monitoring, measured survey documentation, and formal regulatory data access.

4.2 Recommendations

The following recommendations are offered for architectural practice and spatial planning policy.

Architectural recommendations. Design guidelines should be developed specifically for the Type 36 typology in campus-adjacent zones, acknowledging the commercial pressure these units face and offering spatial strategies that allow limited commercial use without eliminating the residential core. One such strategy is the introduction of a minimum 3-metre deep ‘transitional zone’ at the front of the plot — designed as a semi-open covered structure that can serve as a small commercial space while preserving a clear physical threshold between the commercial front and the domestic rear. Canopy design standards for residential streets should be established, specifying maximum projection, height, and material requirements to prevent footpath encroachment while accommodating the legitimate need for weather protection for commercial customers. Vertical expansion of Type 36 units should be actively encouraged as an alternative to horizontal commercial encroachment: a well-designed upper floor can accommodate either rental rooms (generating comparable income to ground-floor commercial use) or additional domestic space, without sacrificing the ground-floor residential core.

Policy and planning recommendations. Local government (Dinas Tata Ruang, Kota Pekanbaru) should develop a dedicated zoning sub-category for residential areas within a defined radius (recommended: 500 metres) of

university campuses — a 'campus transition zone' — with explicit and enforceable provisions for mixed residential-commercial use that cap commercial floor area ratios, mandate minimum setback compliance, and require simplified IMB procedures for small-scale commercial conversions. The current regulatory vacuum — in which commercial conversion occurs entirely outside the formal permitting system — should be addressed through a retroactive regularisation programme that allows existing converted units to obtain conditional building permits in exchange for compliance with minimum setback and safety standards. UIR, as the primary economic driver of commercial pressure in the study area, should be engaged as an institutional partner in campus-area planning, including the provision of official campus commercial precincts that reduce the economic pressure on adjacent residential streets.

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