THE RESPONSE OF HYPERMARKET BUILDING FOR ADAPTABILITY IN HOUSING DEVELOPMENTS

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Abstract

This paper aims to explore the key factors to assess the adaptability of hypermarkets into residential units. The study focuses on practice studies in Indonesia, specifically Transmart, Trans Icon and Trans Park all of which are former Carrefour hypermarkets undergoing redevelopment. The research investigates the adaptive capacity and adaptive response of these redevelopments by analyzing factors such as location, economic viability, structural constraints, and regulatory compliance, which are critical to determining the feasibility of such adaptations. The methodology involves a comprehensive review of previous literature, secondary data analysis, and an evaluation of overlapping adaptability assessment instruments. The methodology involves a comprehensive review of previous literature, secondary data analysis, and an evaluation of overlapping adaptability assessment instruments. From these instruments, the study explores their implementation in practice within Indonesia, focusing on case studies of hypermarkets. This is followed by identifying adaptation responses from the owners' perspective, particularly regarding their strategies and decision-making processes in adapting hypermarkets for mixed-use functions. Data collection utilizes Street View Imagery (SVI) to analyze spatial changes, locational factors, and patterns of transformation, providing a visual representation of adaptability. Findings reveal the study identifies two types of hypermarkets adaptation response: those with limited areas, where expansion is primarily vertical with similar functions, and those with larger areas that allow for horizontal expansion. Owners respond by implementing dynamic mixed-use developments on large plots of land, optimizing land use, and integrating various functions such as residential, commercial, and recreational spaces within the same area. For larger areas, new buildings are added, and existing structures are demolished to comply with zoning adjustments and safety regulations. The insights provided by this research contribute to sustainable urban growth and efficient land use in Indonesia, emphasizing the need for strategic adaptability.

***Keywords**: adaptability; hypermarket; adaptation response; housing development, Sustainable*

INTRODUCTION

The adaptability of buildings of commercial functions like hypermarkets, is gaining attention to address evolving urban demands and posing a significant challenge for urban planners, designers, and architects to develop innovative design strategies. The architecture profession, basically known for its focus on aesthetic and functional design, now plays a crucial role in sustainable management and the optimization of the built environment throughout a building's lifecycle. Architects are increasingly responsible for ensuring that buildings are not only visually and functionally appealing but also adaptable, resource-efficient, and sustainable in the long term(Noor Prabowo & Ismail Hasan, 2024). Creating sustainable environments that optimize resource use and are capable of responding to evolving social demands is becoming a crucial focus in modern urban development. Such environments are essential for reducing resource consumption while ensuring that urban spaces remain adaptable to future societal changes. The increasing complexity of urban areas requires a multifaceted approach, integrating sustainability with adaptability to create resilient urban infrastructure.

Previous studies have mostly focused on differentiating building transformations from both user and owner perspectives to review adaptive capacity of vacant building (Geraedts et al., 2014). Furthermore

they introduced evaluation instruments to assess building flexibility, enabling owners and developers to better understand the adaptive capacity of structures (Geraedts, 2016). By developed these tools, they making significant contributions to the field of building adaptability. However, despite these advancements, particularly in Indonesia, research has predominantly centered on adaptive reuse of historical buildings. Most studies have explored the transformation of residential buildings from colonial or modern regional eras into commercial spaces, driven by urban expansion. The *highest and best use* approach has been applied at some cases, revealing that mixed-use functions like retail, restaurants, and galleries are the most profitable. The highest and best use approach also evaluates buildings based on *net present value* for aiding in determining efficient reuse strategies (Fitri et al., 2023). While historical building adaptation has been extensively studied, there is limited exploration of non-historical building conversions, especially in addressing Indonesia's housing backlog, exacerbated by population growth and urbanization (Perdamaian & Zhai, 2024). Therefore, this paper aims to fill the gap in the discourse and explore the potential for converting vacant buildings into housing.

Globally, building conversion discussions have expanded to include transformations of offices and industrial structures into housing. Studies in the Netherlands found that 70% of respondents favored renting in adapted buildings, with factors like private outdoor spaces and unit size playing a key role (Glumac and Islam, 2020), suggesting a growing market for adaptive reuse in response to shifting lifestyle and housing needs. Studies on housing modifications indicate that implementing creative spaces in residential homes can enhance self-organization and resilience in architecture, research has shown that residents satisfaction tends to increase with room function compromises, noise management, and improved maintenance, with common modifications being room division and function swapping (Asharhani & Gupitasari, 2021). In the context of resilient house, studies suggest that layout adaptations have made homes more resilient by fostering learning and self-organization (Asharhani & Sari, 2022). As occupants adapt to their living conditions by modifying their homes, they demonstrate an ability to create resilient spaces that can easily change functions. This flexibility allows residents to repurpose spaces to meet diverse needs, which emphasize the importance of sustainable housing policies that encourage more flexible approaches to building use (Glumac & Islam, 2020). Therefore, this paper aims to fill the gap in the discourse and explore the potential for converting vacant buildings into alternative functions, such as residential housing.

With the rise of online consumption, hypermarkets face new challenges regarding their function, while the need for housing remains unmet. This study investigates the key factors influencing the decision to convert commercial spaces into residential units, bringing new discussions into the context of building adaptation in Indonesia. The originality of the research on the transformation of the Giant hypermarket in Gading Serpong, Tangerang Regency, into a G-Town Square food court is highlighted by the detailed examination of spatial adaptation through adaptive capacity building principles (Asharhani, 2024). Based on adaptive capacity framework (Geraedts et al., 2014), the study identifies two primary conditions that enabled the conversion: first, the increase in user density by subdividing the original hypermarket space into smaller, more numerous units, thereby enhancing the building's user capacity. Second, the horizontal expansion of the building's usable surface area allowed for a broader range of activities and tenants to occupy the space. These spatial modifications not only enhanced the functional adaptability of the building but also contributed to the vibrancy and dynamism of the urban environment by attracting diverse users.

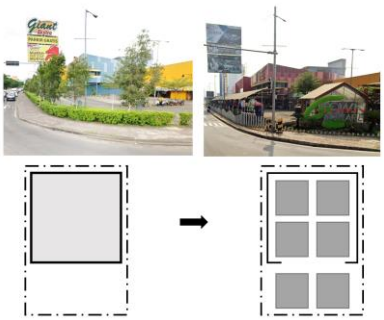

Figure 1. The adaptation response of flexibility: increasing user units and horizontal expansion (Author, 2024)

Considering the widespan structural configuration of hypermarkets and the modular nature required for residential units, this study seeks to examine spatial transformation strategies in various case studies, particularly focusing on the conversion of former Carrefour hypermarkets into Transmart, Trans Park, and Trans Icon developments. Addressing recommendations that emphasize the importance of adaptability in extending the lifecycle of existing buildings, which explores the extent to which adaptability can be implemented in existing buildings (Askar et al., 2021). This research investigates the key indicators of building adaptability and explores the potential of repurposing hypermarkets into residential or mixed-use developments. The central hypothesis posits that, despite the uniform initial function of these

hypermarket structures, each case study demonstrates distinct transformation strategies. These strategies will be analyzed based on adaptability indicators established in previous research. This study aims to provide a comprehensive understanding of how property owners address the growing demand for housing, utilizing spatial analysis to yield deeper, actionable insights into the adaptive reuse of buildings within dynamic urban environments.

PREVIOUS STUDY

Circular Building Adaptability and Design for Adaptability

Circular building adaptability refers to the capacity of a building to change its configuration and extend its usefulness throughout its lifecycle while ensuring that materials remain within a closed-loop system. The concept of adaptability is integral to circular building strategies, promoting design for disassembly, multi-functionality, and spatial transformability. These strategies reduce environmental impact by minimizing waste and enabling the reuse of building components. Circular building adaptability aims to ensure that buildings can respond to evolving needs without necessitating full-scale demolition, which contributes to long-term sustainability (Hamida et al., 2022),.

The Design for Adaptability framework promotes the capacity of buildings to be easily modified in response to emerging needs or future circumstances. This framework enables the building to accommodate various functions over time, thus enhancing its flexibility and longevity. However, while Design for Adaptability has been widely recognized for promoting adaptability, comprehensive methods for assessing a building's adaptability over its lifecycle are still lacking (Askar et al., 2021). This gap in assessment tools highlights the need for more integrated evaluation frameworks that can assess both circularity and adaptability, ensuring that buildings can meet long-term sustainability goals.

Previous research has emphasized the connection between adaptability and sustainable practices, such as the circular economy. Adaptable buildings extend the building's lifecycle and reduce the need for new construction by repurposing existing spaces and materials. Adaptability also offers economic, environmental, and social benefits, driven by demographic shifts and technological advancements (Mlote et al., 2024). However, existing circular building frameworks do not fully leverage the potential of adaptability, resulting in fragmented implementation across the industry(Ollár, 2024). To address this gap, Ollár (2024) proposes a more systematic integration of circular building adaptability into design and planning practices. This approach would involve both short- and long-term strategies, ensuring that buildings remain functional and adaptable throughout their lifecycle. Such an integrated framework would allow developers and planners to better predict future needs, reducing the environmental footprint of new constructions by making better use of existing structures. Ultimately, enhancing circular building adaptability will require collaborative efforts across the architecture, planning, and construction sectors to establish more holistic and effective assessment tools.

Adaptive Capacity by Transformation Dynamic from Owner Perception

The adaptive capacity of buildings can be assessed using seven transformation dynamics indicators from the owner's perspective. These indicators offer insights into how buildings can respond to changing demands and ensure long-term utility and sustainability. The framework emphasizes three types of flexibility: rearrange, extension, and rejection. Owners focus on adaptability aspects such as reallocation or redesign of spaces by joining unit or changing function; grain size adjustments for changing unit division; facility upgrades, quality enhancements; expansion potential by rejection or reduction of building areas; and potential transfer to new locations (Geraedts et al., 2014). These considerations allow building owners to make strategic decisions that align with market needs and operational goals.

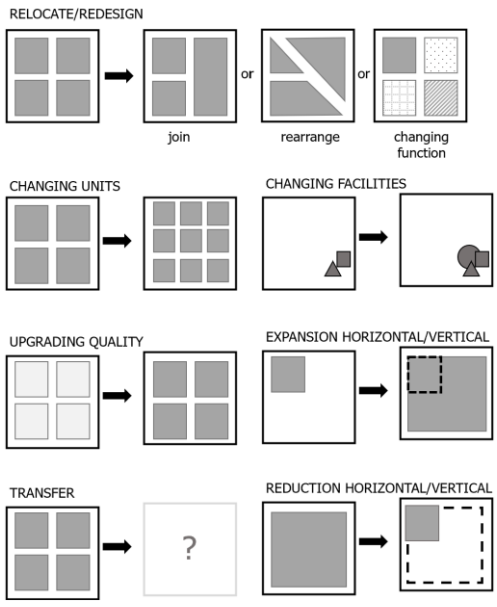

Figure 2. The diagram of seven indicators for transformation dynamic from owner perpsective, redrawn from(Geraedts et al., 2014))

While the societal perspective underscores the importance of future use value and the user's focus

highlights functionality and comfort, this study centers on the owner's viewpoint. This approach prioritizes economic viability and long-term adaptability, ensuring that decisions regarding transformation align with financial and strategic objectives (Geraedts et al., 2014). Building transformation and adaptation are driven by motives such as reducing life cycle costs, creating future-proof buildings, and enhancing marketability. However, challenges include assumptions about higher costs, lack of life cycle costing, uncertainty about benefits, and fragmentation among stakeholders. These obstacles highlight the need for further research on the economic and practical advantages of adaptability (Pinder et al., 2013). The owner's perspective plays a critical role in evaluating the adaptive capacity, balancing current requirements with future flexibility to maintain the building's relevance in a dynamic environment. Changes in buildings are often driven by organizational intent and external triggers rather than system obsolescence, disrupting traditional lifespan models. This highlights the need for new frameworks to predict and categorize changes, recognizing that adaptability depends as much on non-building factors as on the building systems themselves (Kamara et al., 2020). The owner's perspective is crucial in discussing building adaptability, as it shapes strategic decisions that balance economic viability, market demands, and long-term functionality.

Hypermarket Adaptability and Functional Conversion

The adaptability of hypermarkets, especially in the context of transforming them into residential or mixed-use developments, has become a crucial focus in urban planning. Hypermarkets, characterized by their wide-span structural designs, are typically constructed for open-plan retail spaces, which poses a challenge when repurposing them into modular residential units. Previous studies have examined adaptability from the perspectives of both owners and users into severas spatial configuration, and introducing instruments to assess the flexibility of these structures(Geraedts, 2016; Geraedts et al., 2014). However, the transformation of hypermarkets presents unique challenges, as they were not originally designed for residential use, and substantial structural modifications are often required.

In Indonesia, the transformation of former Carrefour hypermarkets into mixed-use developments such as *Transmart*, *Trans Park*, and *Trans Icon* is driven by evolving market dynamics that demand diversified urban spaces. These transformations reflect an economic strategy that seeks to optimize land use by integrating residential, commercial, and recreational functions to address growing housing shortages in urban areas. Owner’s decision to spearhead these conversions aligns with global trends in adaptive reuse, wherein large-scale vacant commercial spaces are repurposed to meet emerging urban demands, particularly for housing. Traditional hypermarket sites are typically located in strategic urban areas and are supported by existing infrastructure, positioning them as highly advantageous assets for cities experiencing housing shortages and pursuing urban densification initiatives (Grachova, 2024). The economic feasibility of such adaptive reuse projects is often contingent on the structural adaptability of the original building and its strategic location within burgeoning urban centers.

However, despite the success of these conversions, significant challenges persist, particularly concerning the structural limitations inherent in hypermarket designs. The wide-span, open-plan nature of hypermarkets poses difficulties in repurposing them into modular residential units. In the context of Permitted Development Rights in the UK, these structural constraints have often resulted in suboptimal housing conditions, characterized by limited living space and poor urban livability (Madeddu & Clifford, 2023). This underscores the need for careful planning and design modifications to ensure that hypermarket transformations not only meet housing demands but also adhere to urban livability standards.

The potential for repurposing hypermarkets into multifunctional spaces that serve both residential and commercial needs is considerable. The strategic location of hypermarkets within urban hubs as an opportunity for adaptive reuse(Williams, 2023). By integrating principles of the circular economy into urban planning frameworks, cities can capitalize on these conversions to create sustainable, resilient urban spaces. This approach addresses immediate housing shortages while simultaneously promoting long-term urban resilience by optimizing the use of existing building stock and reducing the need for new construction.

MATERIAL AND METHOD

This research is structured into several stages as illustrated in the diagram. It begins by exploring of various literature and previous studies as secondary data, which serve as the foundation for understanding adaptability in buildings. Notable sources on adaptability parameters and instruments, housing preferences for adaptive reuse, circular building adaptability and the regeneration of hypermarket sites into mixed-use developments. This literature provides critical context for key indicator of adaptability applied to existing buildings, especially in addressing issues like housing shortages and building vacancy rates. Additionally, primary data collection will be conducted through spatial analysis using Google Earth and Google Maps, complemented by direct site visits and observations.

Street view imagery (SVI) and GIS are increasingly utilized as essential methods for urban analytics and studies of the built environment. SVI enables the detailed examination of visual features from a horizontal, human-scale perspective, complementing GIS, which provides geospatial analysis and mapping capabilities. Together, these methods offer a comprehensive approach to understanding and planning urban spaces (Biljecki & Ito, 2021). This will be followed by a spatial and functional analysis to trace and visualize the physical changes in these buildings over time.

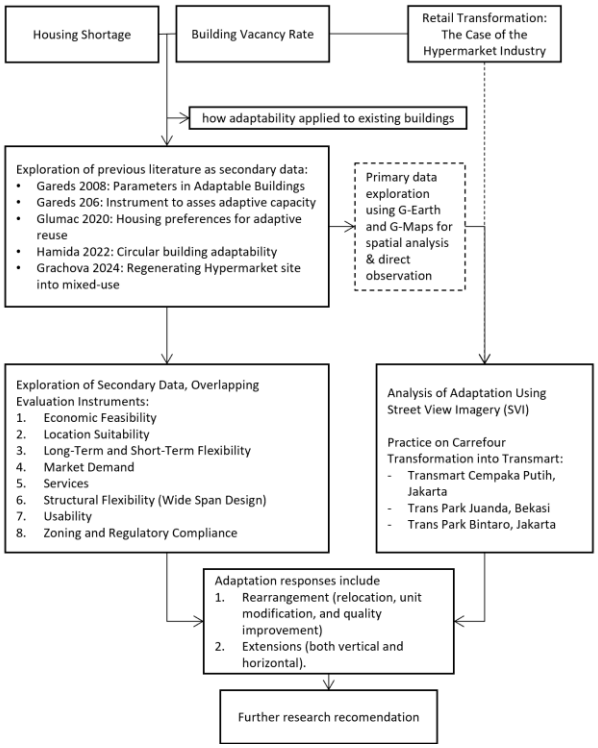

Figure 2. Research stages diagram (Author, 2024)

The next phase involves a detailed exploration of secondary data to assess overlapping evaluation instruments. These instruments cover key criteria such as economic feasibility, location suitability, long-term and short-term flexibility, market demand, services, structural flexibility, and regulatory compliance. These evaluation factors are applied to case studies of Carrefour hypermarket transformations in Indonesia (Transmart Cempaka Putih, Trans Icon Juanda Bekasi, and Tran Park Bintaro). By analyzing the adaptability of these structures, the study seeks to establish constraint-based adaptability categories. Ultimately, the findings will contribute to recommendations for further research on building adaptability and transformation strategies within urban development contexts.

RESULT AND DISCUSSION

Synthesis of Core Indicators for Building Adaptability

This research commences by synthesizing key variables identified across five pivotal studies on building adaptability, which collectively underscore essential factors for assessing a building's adaptive potential. Geraedts (2008, 2016) focuses on critical aspects of structural flexibility and usability, essential for the repurposing of both small-scale and large-scale structures. Grachova (2024) emphasizes the significance of market demand and regulatory compliance in the successful regeneration of hypermarkets into mixed-use developments. Meanwhile, Glumac and Islam (2020) underscore the importance of housing market preferences and the provision of adequate services in facilitating adaptive reuse, while Hamida et al. (2022) align adaptability with circular economy principles, addressing long-term and short-term building adaptability in the context of sustainability. These studies converge on six core adaptability variables: Economy, Location, Long-Term and Short-Term Use, Market Demand, Building Services, Structural Flexibility (wide-span designs), Usability, and Zoning & Regulatory Compliance. Despite their diverse focus areas—from small residential structures to large hypermarket conversions—each study underscores the relevance of these variables in evaluating adaptability. This synthesized framework provides a robust foundation for assessing adaptive reuse projects, particularly in transforming large commercial spaces into economically feasible and sustainable mixed-use developments.

Table 1. Indicators of Functional Adaptability (Author, 2024)

Indicator	Source	Definition
Economy	Economic Considerations (Geraedts, 2008)	Cost implications of adaptability balance between upfront investment in flexibility and long-term benefits.
	Economic Viability (Grachova, 2024)	Financial considerations, including the cost of redevelopment and potential returns from mixed-use conversion.
Location	Strategic Location (Grachova, Mariia. 2024)	Particularly in urban areas with strong demand for housing
	Site (Geraedts, Rob. 2016)	The site defined by legal boundaries, remains in existence far longer than the buildings it holds is considered everlasting.
Long Lasting & short term	Base Building and Fit-out Separation (Geraedts, Rob. 2008)	The distinction between long-lasting base structures and customizable, short-term fit-out elements enables future reconfigurations.
	Support and Infill	The application distinguishing

	(Geraedts, Rob. 2016)	long-term structural elements (support) from short-term adaptable components (infill)
	Configuration Flexibility (Hamida, et. al. 2022)	The ability to change the internal space layout without requiring significant new materials.
	Product Dismantlability (Hamida, et. al. 2022)	The ease of demounting building components for reuse or reconfiguration without causing damage.
	Design Regularity (Hamida, et. al. 2022)	Following standardized or modular designs to facilitate adaptability.
Market Demand	Market Demand for Residential Space (Grachova, Mariia. 2024)	The local demand for housing particularly in areas where retail spaces are declining.
	Private Outdoor Spaces (Glumac, et.al. 2020)	Access to outdoor areas like gardens or balconies emerged as a significant preference for potential tenants, influencing decision to live in an adapted building.
Services	Building Services (Geraedts, Rob. 2008)	Services positioned in modular or fit-out components allow easier modification and expansion
	Services (Mechanical, Electrical, and Plumbing) (Geraedts, Rob. 2008)	The adaptability of HVAC systems, communication networks, and electrical wiring often require updates or replacements affecting the building's overall flexibility.
	Resource Recovery (Hamida, et. al. 2022)	The ability to regenerate resources (e.g., using renewable energy systems) and minimize consumption.
structure wide span more flexible	Volume Scalability (Hamida, et. al. 2022)	The ability to expand or shrink the building or individual units as needed.
	Structural Design (Geraedts, Rob. 2008)	Flexible structural systems, such as open-framed spaces, allow for changes in layout and functionality, whereas larger spans tend to increase adaptability but at a higher cost.
	Building Structure and Design (Grachova, Mariia. 2024)	The structural adaptability including open floor plans and flexible frameworks, affects how easily the space can be converted into residential units or other functions
	Structure (Geraedts, Rob. 2016)	The building's foundation and load-bearing elements must be robust yet flexible to accommodate future changes.
	Unit Size (Glumac, et.al. 2020)	The size of housing units was a critical variable, with larger spaces generally being preferred.
Usability	Space Plan (Geraedts, Rob. 2016)	The internal arrangement, including movable partitions, ceilings, and floors, should be easily reconfigurable.
	Building Usability (Glumac, et.al. 2020)	This refers to how well an adapted building meets the functional needs of new users. It includes factors such as layout, accessibility, and the ability to convert spaces for different uses.
	Asset Refit-ability (Hamida, et. al. 2022)	The ability to refit spaces and components to meet changing requirements
	Asset Multi-Usability (Hamida, et. al. 2022)	Using spaces or components for multiple functions, such as shared facilities.
Zoning & regulatory	Regulatory Constraints (Geraedts, Rob. 2008)	Zoning laws, building codes, and fire regulations can restrict how easily a building can be adapted for new uses.
	Zoning and Regulatory Flexibility (Grachova, Mariia. 2024)	Ability to rezone commercial spaces for residential or mixed-use purposes.

In addition to the six primary adaptability indicators: Economy**,** Location**,** Long-Term and Short-Term Use**,** Market Demand**,** Building Services**,** Structural Flexibility**,** Usability**,** and Zoning & Regulatory Compliance**,** several other critical factors emerge from the literature, offering deeper insights into the adaptability of Carrefour hypermarkets. These include Customization and Standardization (Geraedts, 2008), which emphasizes balancing standardized building components for ease of adaptation without limiting future flexibility, and Technological Integration (Geraedts, 2008), where the ability to accommodate new technologies without extensive modifications enhances adaptability. Infrastructure and Connectivity (Grachova, 2024) highlights the importance of established transport networks for site appeal, while Community Engagement and Social Needs (Grachova, 2024) addresses the integration of social amenities to foster vibrant, adaptable developments. Exterior Flexibility (Geraedts, 2016), or the adaptability of the building's façade and roof systems, supports long-term functionality, and Functional Convertibility (Hamida et al., 2022) focuses on the building's capacity to shift between different primary uses, further enhancing its adaptability potential. These additional factors offer a more comprehensive framework for evaluating the transformation of hypermarkets into mixed-use developments.

This study explores the adaptability of Carrefour hypermarkets by comparing three distinct locations of Carrefour/ Transmart. Each site provides a unique perspective on how Carrefour buildings responded to varying urban contexts, market demands, and strategic transformations. By assessing these locations, the study identifies how key factors such as structural flexibility, technological integration, and zoning compliance influenced their adaptability. This analysis provides valuable insights into the mechanisms that enable the conversion of hypermarkets into more

versatile, multifunctional developments, offering lessons for future urban transformation projects.

Imagery in Transforming Hypermarket Building

Adaptation in retail spaces, such as the transformation of Carrefour into Transmart, involves strategic changes to align with evolving consumer preferences and market demands. Transmart, formerly Carrefour, enhanced its marketing strategies to gain the attention and loyalty of its consumers during the rebranding process (Meliyanawati et al., 2020). Carrefour in Indonesia has rebranded itself as Transmart, introducing significant changes in infrastructure, concepts, and offerings under the theme of "One Stop Shopping." This approach integrates shopping, entertainment, dining, and fashion into a cohesive experience, garnering enthusiastic responses from Indonesian consumers(Putri, 2021). Transmart's unique concept sets it apart from other retail companies, providing not only essential shopping needs but also recreational spaces for families. The entertainment facilities cater to a wide range of ages, from children to adults, offering various attractions. Furthermore, Transmart has expanded the physical structure of its stores, increasing the number of floors compared to the original Carrefour outlets.

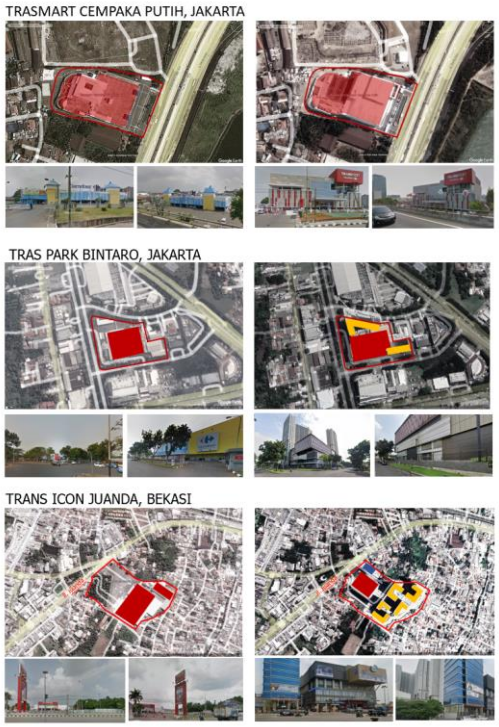

Figure 3. Visualizing Transformation Analysis of Trasmart Cempaka Putih, Trans Park Bintaro, and Trans Park Bekasi (Author, 2024)

The spatial transformation of Carrefour buildings across Indonesia was a significant shift in urban development, as many Carrefour hypermarkets were repurposed into Transmart retail centers. This transformation varied in scope, with some locations undergoing simple conversions to continue their retail function, while others were reimagined as part of larger, mixed-use developments incorporating residential, leisure, and commercial functions. To analyze these changes, this study focuses on four key locations: Transmart Cempaka Putih, Trans Park Juanda, and Trans Park Bintaro. These sites were selected based on the varying degrees of transformation observed, ranging from single-function hypermarkets to multifunctional urban centers. By examining the physical and functional evolution of these buildings, this study aims to understand the adaptability and spatial transformations that have occurred, particularly in relation to the surrounding urban context and market demands.

The analysis reveals that Transmart Cempaka Putih focuses on retail upgrades in line with economic considerations, where the balance between initial investments in adaptability and long-term benefits is prioritized to ensure financial viability. In contrast, Trans Park Bekasi and Bintaro have expanded their developments to include housing functions, addressing market demand for residential space in areas. These adaptations incorporate private outdoor spaces, designed as separate structures from the retail area, such as privat gardens, balconies and podium, which have become significant preferences for enhancing the appeal of the mixed-use developments. From a spatial analysis of the site plans, these transformations also involved zoning reconfiguration to comply with regulatory constraints, such as fire safety and building codes, while leveraging zoning and regulatory flexibility to organize commercial spaces for residential or mixed-use purposes, enabling a seamless adaptation process.

Adaptive Capacity of Building

The transformation of Transpark Cempaka Putih demonstrates a successful adaptation through the separation of the base building structure and fit-out systems, aligning with support and infill concepts. Initially limited in scale, the flexibility of the building's structural design allowed for vertical expansion, adding new floors to accommodate a wider range of functions without the need for a complete rebuild. This adaptability enabled the addition of leisure and dining spaces, driven by evolving market demands in urban centers like Cempaka Putih. The building expanded to four floors, with a hypermarket on the second and third floors, a food court on the first, and Kids City, a mini theme park, on the top floor. This vertical growth highlights both the building's configuration flexibility

and its ability to meet changing consumer needs, despite the limited horizontal expansion of the site. The transformation showcases volume scalability as a critical factor in adapting the building to urban demands, illustrating how vertical expansion can successfully repurpose constrained sites.

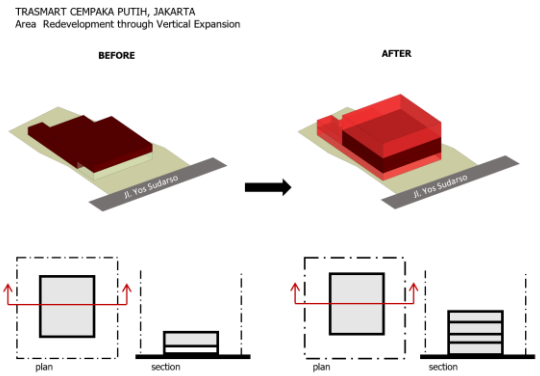

Figure 4. Adaptive Capacity of Trasmart Cempaka Putih, Jakarta (Author, 2024)

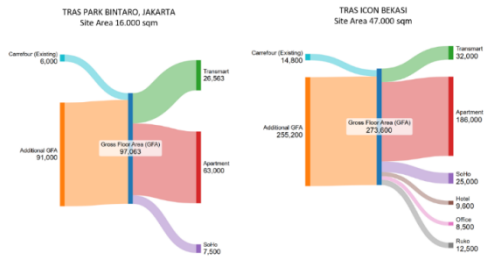

Figure 5. Sankey Diagram of GFA (Gross Floor Area) Adaptation in Carrefour Transmart/Trans Park

A notable example of adaptation is Transmart Cempaka Putih, which has been transformed from the former Carrefour into a modern, multifunctional retail and leisure destination. The building retains its original column spans of 10 meters and 8 meters, integrating structural reinforcements to support the transformation. This aligns with the principle of volume scalability which emphasizes the ability to expand or shrink building units based on functional requirements. Additionally, the robust yet flexible foundation and load-bearing elements adhere to the concept of structure, ensuring the building's capacity to accommodate future changes. The owner has assessed this structure as capable of vertical expansion, making it adaptable to evolving market demands and spatial requirements. Beyond structural adaptability, the capacity for quality upgrades is evident in the building's façade alterations, not only improves the aesthetic appeal but also incorporates modern materials and designs. These changes enhance the building's visual identity, making it more attractive to visitors and better integrated with the surrounding urban context. Such façade modifications demonstrate how adaptability extends beyond internal functionality, contributing to the building's overall quality and long-term relevance.

Adaptation Response in Hypermarket extension with housing function

The adaptation of hypermarkets, such as Carrefour, into Trans Park mixed-use developments represents a strategic response to shifting urban demands, particularly through the integration of housing functions. This transformation aligns with the broader trend of repurposing large-scale retail spaces to include residential, commercial, and leisure uses, optimizing land use while addressing the growing need for urban housing and flexible spaces. By reallocating Gross Floor Area (GFA), these projects create vibrant, multifunctional environments that cater to diverse urban lifestyles.

This strategy aligns with market demand for residential space highlighting the increasing need for housing in areas where retail spaces are in decline. It also considers unit size emphasizing the importance of larger, more desirable housing units. Additionally, the concept of volume scalability ensures adaptability by enabling the expansion or reduction of building units to meet future demands. Furthermore, zoning and regulatory flexibility facilitates the transformation by allowing the rezoning of commercial spaces for residential purposes, ensuring these developments comply with evolving urban planning frameworks.

The transformation of Transmart Carrefour Bintaro and Bekasi into mixed-use developments demonstrates significant changes in Gross Floor Area (GFA) allocation, with a notable emphasis on apartments and Small Office Home Office (SOHO) units. In Bintaro, the existing GFA around 125,000 square meters was adjusted to include an additional 83,000 square meters for apartments, accounting for the largest share of the new composition. This is complemented by 55,000 square meters allocated for the Transmart retail area, 11,000 square meters for a hotel, and 7,500 square meters for office spaces. The substantial increase in residential and SOHO functions reflects a strategic response to market demand for housing and flexible workspaces, catering to urban residents and professionals.

Similarly, in Bekasi, the existing GFA around 14,800 square meters underwent a significant expansion, with an additional 255,200 square meters of GFA added. Apartments dominate this transformation, with 186,000 square meters allocated for residential units, making up the largest proportion of the new development. SOHO spaces also take a significant share, with 25,000 square meters dedicated to this function, followed by 32,000 square meters for the Transmart retail area, 9,600 square

meters for a hotel, 8,500 square meters for office spaces, and 12,500 square meters for commercial shop houses. These allocations underscore the growing demand for urban housing and flexible working environments, positioning the developments as multifunctional hubs that address contemporary urban needs.

Trans Park Bintaro, similar to Transmart Cempaka Putih, was developed on a moderately sized site that allowed for limited functional expansion. Due to its constrained area, the focus of the redevelopment primarily centered on the construction of residential apartment units. The site, while not large enough to accommodate a fully integrated mixed-use development like those seen in larger projects such as Trans Park Bekasi, was still sufficient to support a vertical extension dedicated to residential functions. This resulted in a project that prioritized housing solutions in response to the growing urban population while still maintaining the necessary commercial elements to cater to residents' daily needs.

Although Trans Park Bintaro had enough space for residential apartment towers, it lacked the area to incorporate broader functions, such as extensive retail or leisure components seen in larger Trans developments. Similar to Transmart Cempaka Putih, the primary objective was to maximize the available space for housing while supporting it with essential commercial amenities on lower floors. This approach demonstrates how mid-sized urban developments, when constrained by space, must prioritize certain functions—in this case, residential units—to meet local demand while still contributing to urban densification.

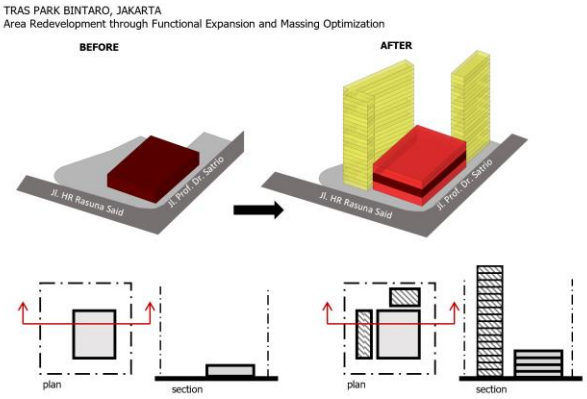

Figure 6. Adaptive Capacity of Tras Park Bintaro (Author, 2024)

The transformation of Trans Icon Bekasi highlights a high level of economic adaptability driven by market conditions and strategic site expansion. Initially, a single-storey Carrefour hypermarket, the site has been transformed into a large-scale mixed-use development to accommodate residential, commercial, and leisure spaces. The shift in consumer behavior, away from standalone hypermarkets and toward integrated, multi-functional environments, played a critical role in driving this transformation. Regulatory adaptability, particularly regarding zoning and permissions to expand both vertically and horizontally, was crucial to enabling this redevelopment. This flexibility allowed for the creation of a 32-storey building, expanding the site's usability and aligning with the market's demand for more diverse urban spaces.

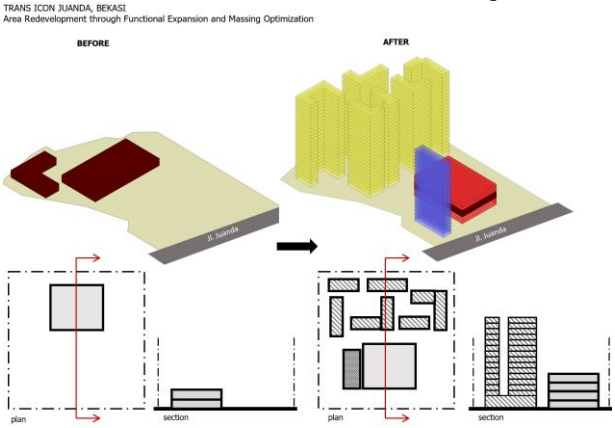

Figure 7. Adaptive Capacity of Tras Icon Bekasi (Author, 2024)

Trans Icon Bekasi economic viability and strategic location further justified its large-scale transformation. Located in a rapidly urbanizing region, the project responded to the growing demand for residential and commercial spaces. The site's flexibility enabled the development of high-rise buildings, which would not have been feasible without careful planning for both vertical and horizontal adaptability. The project's ability to cater to multiple sectors—residential, retail, SOHO units, and offices—demonstrates the adaptability of both the building's structure and its design. The inclusion of leisure and hospitality spaces, such as a hotel and shophouses, further reflects the growing trend of urban densification and integrated living environments.

One of the most remarkable aspects of transformation is its scalability, as the site expanded fivefold. The adaptability of the building structure, particularly with regard to separating the base building from its fit-out systems, allowed for a diverse range of building typologies within the development. The project now includes apartments, offices, a hotel, and retail spaces, all coexisting in a self-sustaining urban hub. The ability to accommodate these varying functions under one development umbrella showcases the importance of zoning and regulatory flexibility in facilitating large-scale urban transformation. It underscores the necessity for adaptable regulations to support projects that enhance the long-term usability and sustainability of urban spaces.

The findings from the study highlight several key factors influencing the success of hypermarket

transformations into mixed-use developments. Strategic location plays a pivotal role in ensuring the success of these conversions. Hypermarkets situated in prime urban locations, such as Trans Icon Bekasi, benefit from proximity to key infrastructure, including residential hubs, commercial centers, and public transportation. These factors drive both accessibility and desirability, making the spaces more attractive to residential buyers and commercial tenants alike. The accessibility of these locations ensures that the transformed spaces not only meet existing market demand but also thrive economically due to the increased foot traffic and ease of access.

Another critical driver of transformation is the residential market demand, especially in densely populated cities with housing shortages like Bekasi. The conversion of hypermarkets into mixed-use spaces, primarily incorporating residential units, provides a solution to housing shortages while maintaining commercial functions within the same development. Furthermore, the shift in retail markets, driven by the rise of e-commerce, has made the repurposing of traditional retail spaces into mixed-use developments a necessary response. For example, Transmart Cempaka Putih, due to its site constraints, has retained its core hypermarket function but adapted by adding complementary spaces, such as food courts. This reflects a balance between economic viability and the limitations imposed by the smaller site, illustrating how adaptability within the existing footprint can still meet evolving market needs.

CONCLUSSION

In conclusion, the most significant indicators influencing the adaptation of hypermarkets into housing developments are location, the capacity of the site to accommodate sufficient additional Gross Floor Area (GFA) for housing, and the structural flexibility to support horizontal expansions. These factors align with the one of indicator of transformation in adaptive capacity. The needed of horizontal extensions are crucial due to the privacy and exclusive outdoor spaces required for residential units, as well as their need for separate access from commercial areas. Additionally, regulatory flexibility plays a pivotal role, particularly in permitting changes in function. And also zoning and regulatory adjustments that allow the integration of housing with supporting commercial functions.

Other factors also contribute to successful adaptability, including economic considerations, which drive the need to increase revenue. Market demand, as hypermarkets are often adapted in developing regions and changing lifestyles, which have diminished hypermarkets as primary destinations, requiring new attractions to sustain viability. Structural flexibility is essential not only for facilitating adjustments within the same function (altering commercial uses) but also for enabling the demolition of outdated structures to accommodate zoning changes for residential purposes. However, this study has not extensively discussed usability and building services as influencing instruments due to data limitations, leaving these aspects open for future exploration.

However, further research is needed to explore additional factors influencing these transformations, particularly in building services and utility systems. Operational elements, such as energy efficiency, waste management, and the integration of smart technologies, are critical to enhancing long-term sustainability. Investigating how service infrastructure can be adapted to both residential and commercial functions will offer valuable insights into maximizing adaptability. Future studies should also examine the potential for adapting utility systems within smaller or constrained sites, like Transmart Cempaka Putih, to optimize functionality. Expanding this line of research, alongside exploring social inclusivity and technical adjustments to structural and building services, will contribute to more sustainable and adaptable urban redevelopment strategies in mixed-use hypermarket transformations.

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