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## Impacts of Online Retail Business on the Built Environment in the Pandemic Context

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## Impacts of Online Retail Business on the Built Environment in the Pandemic Context

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## Impacts of Online Retail Business on the Built Environment in the Pandemic Context

### ABSTRACT

The growth of online retail is considerably fast, prompted by the development of information technology and the internet in society. During the pandemic, the law prohibits people from commencing activities outside their homes to prevent the virus from spreading. This situation made accessing e-commerce for online shopping became a norm. Last year, research presented approximately twenty million visitors increase in Indonesian online retail platforms during the first half of 2020, which was also the earlier phase of the pandemic in Indonesia. The highest-selling products during this period fell in the retail category, including fashion, hobby, and medical drugs and supplies. The two pieces of information indicate that the online retail business was booming because of the pandemic. From an architectural perspective, discussions regarding online retail business at its early growth were unfavorable as this business reduces the need for physical commercial buildings or stores. Later, architectural research stated that the industry is beneficial as it birthed a new industrial facility known as a fulfilment centre.

The booming business and the current favorable impression of online retail became the catalyst of this paper; it provided a short review of the industry in the pandemic context and what it may bring for architectural research in the future. This research applies a qualitative approach developed through a structured literature review on the online commercial market during the pandemic, online retail business over time, and related real estate development. The result is a diagram of how the pandemic, technology, internet, and architecture are correlated and several topic recommendations for future studies.

Keywords: covid-19 pandemic; industrial facility; online retail; fulfilment centre

### INTRODUCTION

The global COVID-19 pandemic that began in December 2019 in China has lasted for approximately 18 months. Many countries advised their citizens to avoid crowds or going out of their homes unless for emergency cases. Schools and offices were closed or only partially active. Cafés, restaurants, supermarkets, and other commercial establishments have also been inactive for some time; some even went out of their business. After a few months of not conducting activities in public, the people have adjusted to working or taking lessons from the comfort of their homes. In addition to these activities, they have also shifted their shopping preference from offline to online, leading to the increased online shopping activities (UNCTAD, 2021).

Online shopping activity can assist users in acquiring various retail products such as medicines, toiletries, fashion items; and services such as insurance or travel consultant using an e-commerce platform. Online retail businesses focus solely on retail commodities. The online retail industry is defined as similar to the physical retail establishment where products and their prices are displayed on the shelves, and the visitors can freely browse them before making a purchase.

The difference lies in products with their prices' display method and payment of which everything is done on an online platform (McKinsey, 2018). Because online retail uses an internet-based e-commerce platform, the business also grew alongside information technology and the internet (Aribawa, 2016).

Aligned with this statement, the increase of online shopping activities in Indonesia is parallel to the number of internet users: the internet penetration rate has reached up to 54% of the total population in this country (Kominfo, 2017). While concerning the pandemic, the Indonesian e-commerce establishments had experienced increases of approximately twenty million visitors within the first half of 2020 only (Permana et al., 2021) when the pandemic has just begun. Although the research by Permana et al. (2021) does not specify online retail in its analysis, the top commodities involved in the transactions were retail products separated into several categories, including hobby, fashion, and electronic. The popularity of hobby-related products may be related to the argument that online shopping provides more time for customers, increasing their tendency to explore the products more (Hardiyanto et al., 2020).

From the architectural perspective, previously, online retail was argued as harmful to the real estate business because it decreases the need for physical stores. Several empirical studies found that online retail is reducing the demand for the commercial estate. However, apart from the commercial estate, the business has also created the need for a new industrial estate facility similar to a warehouse (Carr, 2016; Boysen et al., 2018; Patricia, 2020; Friedman, 2020), later known as the fulfilment centre. The contrast between the two arguments and the new dedicated industrial facility made the online retail topic an exciting subject for an architectural review. Additionally, the unknown ending of the Covid-19 pandemic may further increase the online retail business volume. Therefore, understanding this subject hopefully can benefit related stakeholders such as business owners, architects, real estate developers, and the government to cope with the increasing demand for the facility in the future.

## METHODS

This study developed a structured literature review of online retail and technology in real estate development. The study began with a literature study on online retail as an information technology product and how it can be perceived from architectural perspectives in the pandemic context. Several keywords similar to online retail were also used, namely e-commerce, e-tailing,

and electronic marketplace, to ensure broad coverage. This research initially obtained over two hundred and fifty literature consisting of scientific papers and reporting or news from reliable sources mostly published between the late 1990s to 2020. Presented at the end of this paper is a diagram of the relationship between the pandemic, technology, online retail business, and architecture.

## RESULTS AND DISCUSSION

### 1. Online Retail

#### 1.1 Definition

The following terminologies: ‘online retail’, ‘e-commerce’, ‘online commerce’, ‘e-tailing’, and ‘electronic marketplace’ are often used extensively without clear differentiation, albeit their meanings are not entirely similar. ‘E-commerce’ or ‘online commerce’ is associated with buying and selling goods and services online (Hurtado et al., 2019). Like e-commerce, ‘electronic marketplace’ is defined as both a medium and a society of multiple sellers and buyers who conduct commercial exchanges (Grieger, 2003). Meanwhile, ‘online retail’ focuses on retail commodity trading (Iqbal, 2012; Widagdo, 2016; McKinsey, 2018), while ‘e-tailing’ is the activity of online retail business (Wang, 2002). This research uses the ‘online retail’ term because it is directly related to the architectural discussion of the industrial facility and in the pandemic context.

Generally, e-commerce is divided into closed and open market types. The open market type is publicly accessible, while the closed market is restricted to certain suppliers or consumers. With the emergence and advancement of technology nowadays, e-commerce has become more significant. The constant technological improvement has benefited many stakeholders in businesses, particularly the buyer and sellers. The e-commerce platform provides market expansion, operational efficiency, and service effectiveness, whichever type. Detailed information on the differences is illustrated in Table 1.

**Table 1:** E-commerce types

Closed market	Open market
<ul style="list-style-type: none"> <li>• Business-to business (B2B)</li> <li>• Restricted user</li> <li>• Product and service exchange between company</li> <li>• Known and connected partners</li> <li>• Networking based security</li> <li>• High degree of information sharing and collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• Business-to-Customer (B2C), Customer-to-Business (C2B), and Customer -to- Customer (C2C)</li> <li>• Public user</li> <li>• Product and service exchange to the public</li> <li>• Known and Unknown partners</li> <li>• Requires additional authenticity and security measures.</li> <li>• Low degree of information sharing and collaboration</li> </ul>

Sources: *Author Adaptated from (Grieger, 2003) and (Haryanto & Chang, 2018))*

Within the e-commerce platform, online retail business can be held at both closed and open market e-commerce types. There has not been much categorization on online retail industry; however, one research in 1997 classified the business according to the their online catalogue. The categorization was based on the completeness or variety of products, the complexity of online catalogue's pages, and the extent to which the information per product is provided. The catalogues were categorized into five which are, from the most complex to the most simple: superstore, promotional, plain sales, one-page, and product listing (Spiller & Lohse, 1997). Considering Spiller & Lohse's research in 1997 was done during the beginning of the internet, online retail might only serve as an additional marketing channel that support the walk-in stores. However, as the classification was based on the variety of products, the online retail business speaks about the volume of supply. The industry still deals with physical commodities, although the transaction is virtual.

### 1.2 Online retail in the Covid-19 pandemic

As stated prior in the introduction, online retail businesses in Indonesia grew alongside technology and the internet: both development in the platform's technology and the number of internet users (Iqbal, 2012). Generally, the growth of e-commerce business is influenced by customer demographics such as income, education, shopping application ownership (Lubis, 2018), and behaviour such as convenience, trust, and accessibility (Fadhila & Farmania, 2017; Suleman,

2018). During the Covid-19 pandemic, the businesses further grew, seen from the twenty million visitors increases in the first half of 2020 (Permana et al., 2021).

The cause of online retail business's exponential growth during the pandemic can be traced back to when the restriction policy began. The Indonesian government first implemented a public activity restriction policy on March 31st, 2020 (President of the Republic of Indonesia, 2020) to prevent the virus from spreading as fast as MERS and SARS (Irawan, 2020) from infecting the whole country. The global implementation of a similar policy has stimulated economic crisis, changing human needs and lifestyles (Jilkova & Kralova, 2020). One of the changing lifestyles is the preference of shopping: from offline to online (Koch, 2020; Sheth, 2020).

The shifted shopping preference might have also been supported by the convenience it provided. People are not required to prepare themselves or travel to the shopping destination. Everything can be done from the comfort of their home, as long as they are connected to the internet, e-commerce channels, and online payment system. Therefore, as Hardiyanto et al. (2020) argued, people have ample time to explore more than when they do offline shopping. Additionally, that the lack of activities also stimulates people's tendency toward hedonism (Koch et al., 2020); this is probably why the highest selling products in online retail falls in the category of 'hobby' as argued by Permana et al. (2021).

From business practitioners' perspective, online shopping also enables retail business-owners who could not operate their physical stores because of the social restriction to switch their business model (OECD, 2020). Even when shopping centres have been available again, the online retail channel is still beneficial to the business owners in broadening the scope of the targeted market and will not be neglected easily. The two factors: the comfort level of shopping online and the switched business models, are aligned with the increases in businesses' volumes: visitor increases at the beginning of the pandemic (Permana et al., 2021). Globally, In Indonesia in particular, online shopping increased by about 14%, while offline shopping fell significantly by 24% since the pandemic (DBS, 2020). Without clarity as to when the pandemic will be over, it is safe to say that online retail will continuously grow, at least for some time in the future.

## 2. Online retail and Real Estate Industry.

### 2.1 Commercial Estate

Researches published between 2000 and 2021 argued that online retail as the product of the internet and technology influences real estate trend and demand. Until 2014, much research put online retail negatively, especially as the cause of decreased demand for physical stores (Razali et al., 2014; Worzala, 2001; Dixon & Marston, 2002). An empirical study on several cities in China found that the demand for the commercial estate was influenced by online shopping. The influences include higher store vacancy, the decrease in growth of business floor areas, and the decrease in sales. However, not all walk-in store types received a similar impact from the online retail industry. Various kinds of stores such as apparel, groceries, electronics, and books are more likely to be negatively affected (Zhang *et al.*, 2015). In the US, for example, the walk-in store's sales number will be involved when the Amazon increase their same-day delivery service with the drone (Ninia, 2020). The benefit of walk-in retail is that they are providing a fresh stock which probably the customer needs in an instance. Still, the development of e-commerce might leads to a disturbance of demand for walk-in or physical stores.

While previous research found a correlation between online retail and the decrease of demand for walk-in retail, studies now focus more on how online retail changed commercial retail in physical and locational aspects and business investment models to ensure resiliency (Zimmerman & Killian, 2019). The topics indicate the existence of discourses on how online and walk-in retail can be mutually beneficial. Walk-in retail can increase its performance by entering the domain of online retail. Likewise, online retail can benefit from a multi-channel retailing method that joins the physical field to represent its brand (Jones & Livingstone, 2015; Obando, 2019). An example of how online retail can benefit from the presence of walk-in retail is Amazon Go. Amazon Go has established 26 store locations across the US and UK. With the expansion of amazon's online business to the walk-in or physical store, it is possible to enlarge amazon's market and business as an online retail company (Redman, 2021; statista.com 2021). The same situation is also happening in Indonesia; an online retail company from China, JD, opened its fourth physical outlet in Jakarta. The existence of physical stores built by an online retail company eases customers to get the goods instantly using just the picking-up system. Online and offline were once a different world. Still, with the evolution and innovation of online retail business and commercial estate, the

distinction between online and offline is starting to be blurry. Both online retail and commercial estate can complement each other.

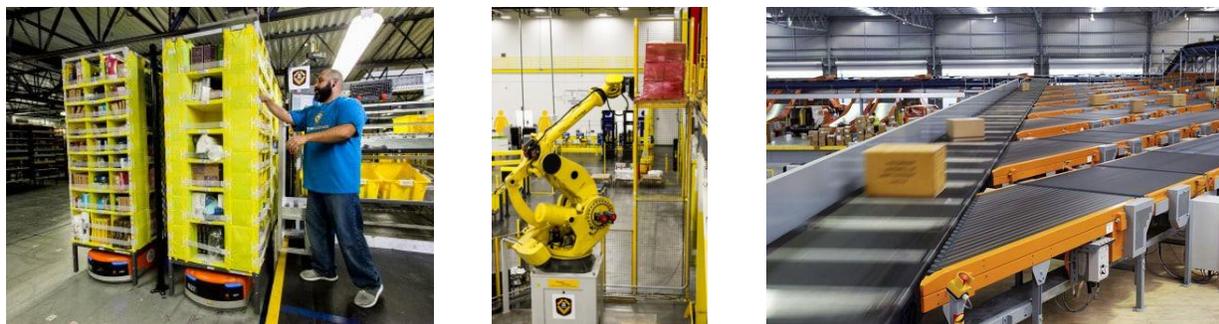
## 2.2 Industrial Estate

Even though the online retail industry utilizes online platforms, they still require physical storage buildings to manage retail inventories. The facility belongs to industrial real estate, which has been taken into importance nowadays, diversifying the real estate industry from the typical commercial, residential, and office building projects. The storage facility falls into the industrial architecture. Industrial facilities were argued to have experienced growth in number and occupancy at a more stable rate than other commercial estates since 2011, precisely because of this online shopping boom (Friedman, 2020). Meanwhile, the economic value of industrial real estate has also made it a lucrative investment, subsequently predicted to keep the economy resilient (AHK Indonesien, 2020).

However, instead of a warehouse, the industrial facility dedicated to the online retail business is the fulfilment centre. The fulfilment centre acts as a warehouse and becomes a distribution point to facilitate connections for the movement of goods, space utilization, and in-city trade (Sapin, 2014; Yu et al., 2016) of an online retail business. Generally, the additional function of a fulfilment centre is to facilitate the logistical processes. The processes including receiving orders, storing, selecting goods, packaging, and delivering goods using a computerized information system for every operational process and serving online retail for B2B and B2C business orders. This definition is obtained through 6 aspects studied based on previous literature: the main function, storage function, inventory management, business model, location, and design. (Kay, 2015; Kawa, 2017; Higginson & Bookbinder, 2005; Singh et al, 2018; Muha et al, 2018; Baker, 2007). Demands for the fulfilment centres are increasing in line with the growing online shopping trends (Berman, 2020; Carr, 2016).

What makes the fulfilment centre particularly distinct from the conventional warehouse in its architecture is the application of technology. These applications are including automated inventory and picking tools such as robotic racking, an automated guided vehicles such as conveyors and automatic pallet carts, and a warehouse management system (Liang et al., 2015). The use of technology in this building provides efficiency in logistics time, shortening the processing and delivery time to the customer. Hence, with the efficiency caused by technology used in the

building, fulfilment centre has become one of the essential facilities to support online retail business.



(a) Robotic Racking

(b) automatic pallet carts

(c) Conveyor Belts

*Figure 1. Technology implementation on Amazon Fulfilment Centre*

*Source: Masud, R. (2019)*

Beside the use of technology, what differentiate fulfilment centre from warehouse is the location. Fulfilment centre is usually located in the centre of the city and close with the customer (knic.co.id). In several cases in the United States, fulfilment centres are built by converting commercial real estate, such as non-performing large shops and malls. The conversion created supply while reviving the low-valued real estate (Patricia, 2020). In the United States, the total valuation for industrial facilities, including fulfilment centres, is growing steadily from 2017 to 2021. The 10% annual growth rate is expected from 2021 to 2028. The growth is correlated with the increased number of online buyers (Grand View Research, 2021). Covid-19 Pandemic is also proven to be the growth factor. The growth can be seen in the third quarter of 2020 by the additional 312 million square feet of space under construction for industrial estate (Thuermer, 2021).

### 2.3 Online Retail, Real Estate, and Covid-19 Pandemic.

Figure 2 illustrates the correlation between technology, architecture, and online retail business in the context of the Covid-19 pandemic. The literature review has suggested Covid-19 as the contextual cause, while the internet and technological advancement are parallel to the growth of online retail. It should be noted that while improving the business process, technological advancement also directly influences the architectural design of the required facility. The

development of technology and the internet go hand in hand to create the online retail industry as part of information and communication technology. These two things influenced the growth of online retail, but the COVID-19 pandemic as an external factor has further triggered the change.

The shifts in real estate products' supply and demand during the pandemic were caused by the changes in people's shopping preferences. Eventually, commercial and industrial real estate products will have to adapt to the existence of the online retail industry and the COVID-19 pandemic. With technological innovations in both real estate products, such as seamless online-to-offline business operation on retail and automation in fulfilment centres, the commercial and industrial real estates can sustain themselves by supporting the online retail business.

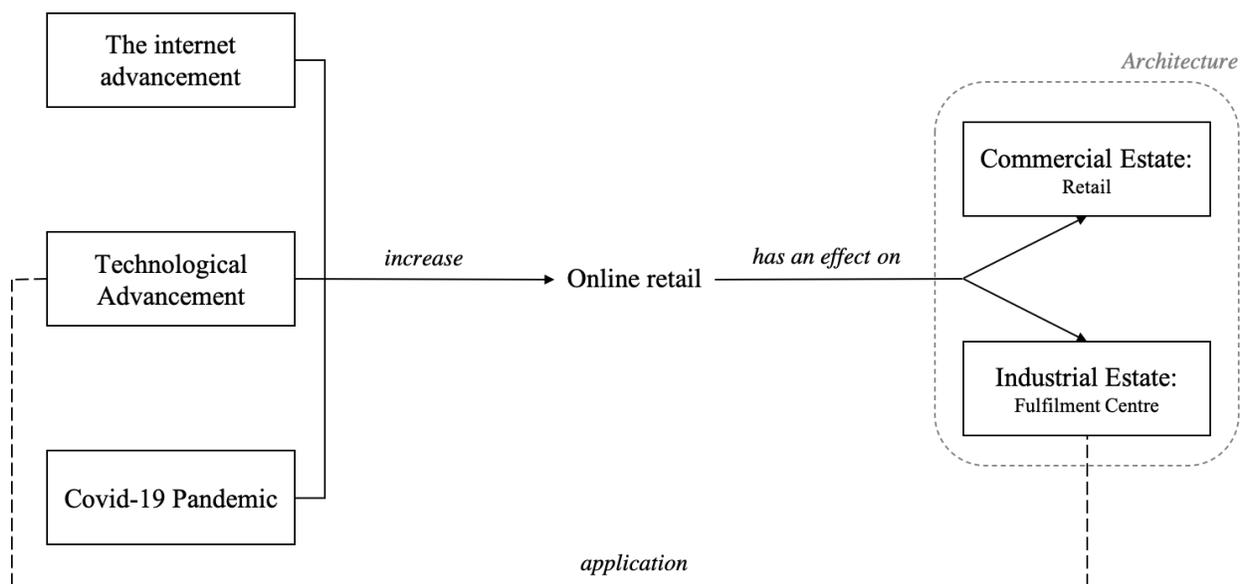


Figure 2. The correlation of online retail and technology in architectural context

Source: Author, 2021

## CONCLUSION

From the review, this study has made several conclusions. Firstly, walk-in retail may not entirely be threatened by the growth of e-commerce due to its ability to serve customers instantly. Thus, walk-in retail may also benefit from online retail business operations. Secondly, is regarding the contribution in the form of the online retail business to a new type of industrial facility referred to as fulfilment centre. This contribution is why the architectural subject research trends have now

put online retail in a more favourable light. Although the business has initially reduced the demand for walk-in retail buildings especially in the pandemic era. For example, In US, the increase demand in e-commerce transaction for healthcare items, groceries, and ICT equipment and apparel correlated with the store closing for several retail store particularly in apparel and electronic store. GAP.inc and Macy's as apparel retail chain closed many of their physical store and preparing to be fully operated online. The same situation also goes to Best Buy as electronic and home furnishing store which also reducing their sales floors to be used for e-commerce's operation. (OECD, 2020; Wahba, 2021; Farfan, 2019)

While online retail may reduce the demand for walk-in retail, it has also created new demand for an industrial facility. The online retail business' demand for a new industrial type facility building is not the sole contributor to architecture; instead, the importance lies in its novelty. This fulfilment centre is an exciting subject for further architectural research. Because despite sharing similar traits with conventional warehouses, the arrangement and flow of the space are different due to the different business processes. The architecture of the fulfilment centre may also reveal something new, especially when considering the applied technology tailored to online retail business. These traits spark another question, for example, regarding architectural design and typology. The particular business process may also spread to the architecture's neighbouring branch of science: urban planning.

Thirdly, the uncertainty of when the pandemic will end may further increase the online retail business' volume. However, even when the pandemic ends, the convenience online retail business offers to its customers remains a valid behavioural aspect that can retain its scale instead of lowering it. As the online retail business is predicted to grow continuously in the future, the demand for the fulfilment centre shall increase. Hence another chance of architectural research of the fulfilment centre in the online retail business context. For architects, developers, and online retail business-owners in general, it is essential to have the fulfilment centre design standardized. A comprehensive design standard will ease the design and construction phases without alienating business owners as users. Meanwhile, from the government's point of view, the establishment of fulfilment centre design guidelines can be used when making policy primarily related to land use and related infrastructures.

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